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(Gelatine Print issued only with Imperial Edition.)
Club-house, Marion, Mass.
A Bachelor's Home, St. Louis, Mo.
U. S. Post-office, Springfield, Mass.
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FOR the first time in many years, there seems to be a little encouragement for those who have at heart the artistic future of the American Republic. According to the New York *Times*, it seems likely that Congress will agree at this session, whatever else it may do with the customs tariff, to abolish the impost upon works of art, thereby reopening to American students the advantage of studying what other people have done before them without paying an exorbitant price for the privilege, as well as provoking those from whom they can learn most into closing their doors against them. The second favorable indication is to be found in the passage by the Senate of Senator Hoar's bill for the establishment of a National Art Commission. We described this excellent measure at some length when the draft was first presented, and need only recall that it provides for the establishment of a Commission, consisting of four sculptors, four painters and three architects, all eminent in their various callings, and three other persons noted for their knowledge of fine art, which shall meet in Washington at least once in every year, and report upon the character and value of such plans of public buildings, monuments or works of art as shall be referred to it by either House of Congress or by the Joint Committee on the Library, and shall, when authorized by Congress, make selections from designs offered by competitors for works of art ordered by Congress. Whether the bill will pass the other House, or be approved by the President if it should, can hardly be predicted at present, but it is a good deal to have it so readily carried through the Senate, and even if it should fail to become a law this year, it is more than likely that the increasing knowledge of such matters among educated men, which has already enlisted, permanently, we may hope, a majority of the Senate on the side of enlightened common-sense, will soon extend its influence over the popular branch, to the great advantage of the citizens of this country.

WHENEVER the change shall come, we may look for a new era in our artistic progress. Up to this time we have never had anything approaching, we will not say to knowledge, but to decent discrimination in artistic matters on the part of the Government, while such recognition of artistic merit as has been officially bestowed has, as a rule, been of such a character as to make its recipient ridiculous. It is quite time that this way of managing an important public interest should be modified, and there is no better method of introducing a better system than by the appointment of such a Commission as Senator Hoar's bill contemplates. That a Commission of experts is the proper body to judge of artistic matters no one can doubt, and there are abundant proofs of the success of such bodies in carrying out their duties, and of the miserable failure of attempts by uninstructed persons to usurp their functions. With a Commission of men whose names and reputation, inspired respect at the head of American artistic affairs, there would soon be an effort among artists to obtain their favorable notice, and the honor which their awards would bestow would supply just the stimulus which art has always lacked among us. As we have frequently insisted, there is an immense amount of artistic feeling in this country, which remains undeveloped for want of something to call it forth. Every one remembers the surprising quantity of the most beautiful and original work which was brought out by the offer of liberal prizes by a firm of wall-paper manufacturers, and in some of our best architectural competitions the designs shown are worthy of any age or country, but the effect of these is irregular and transitory; they elicit good work from those already prepared to do such work, but do almost nothing to encourage persons of more modest attainments as compared with the steady incentive offered by the prospect of Government approval and employment. Some one has said that the knowledge that bishoprics were open to merit was the principal means of keeping the whole body of English clergymen to those habits of industry and enlightened charity which do them so much honor, and the knowledge that an American painter, sculptor or architect could hope, by satisfying a jury of men skilful in his profession, to be sometime publicly honored and rewarded, would redouble the energy and application of the younger men, and, among the older ones, put an end pretty quickly to the practice of those devices by which charlatans are enabled to parade as prodigies before people who have no means of testing their pretensions.

AS to the general question, which will occur to some people, whether art itself is a thing to be encouraged among intelligent persons, or is merely a useless and enervating luxury, Mr. William Morris and Mr. Ruskin can speak much more eloquently than we; but it is worth while for those who denounce art and artists as unworthy the notice of the "practical" and "go-ahead" inhabitants of the United States to reflect whether there may not, after all, be some virtue in quiet contentment, and in the enjoyment of beauty which a little artistic training opens to men. Bustling, not to say greedy, as we are, it is impossible for every one to be first in the race for money. Some must stumble, or fall sick by the way, or, perhaps, be content to lose their place for the sake of helping one still feebler than themselves. The number of such unsuccessful ones, as competition increases, grows larger every year, and the country every year feels more seriously the need of consolation which true art can bring to those who can understand it. To one who knows the depth of feeling, the quick sympathy, inherent in the American character, there is something inexpressibly sad in the dreariness of American middle-class habitations. Where an Englishman would have his sweet little cottage, with some pretty carving, or beautiful lace curtains, or wonderful piece of gardening, to distinguish it from the rival dwellings around it, or where an Italian workman's nerves would absorb balm from the pretty frescos on his front wall, and the brilliant colors of the family clothes-line, the American, more sensitive and more intellectual than either, is condemned to spend his life in a dreary, heartless box of inch-boards, dropped at the side of a dusty street, about which there is nothing to interest or please any person in the smallest degree. In such abodes Americans become the quiet, enduring drudges that we know them. They have nothing to live for but to get a little richer, and if that fails there is nothing left. They could love their homes with a passion worthy of a Greek, but there is nothing about their homes which anybody could by any possibility love, and the only ray of enjoyment, which is with most Americans associated with a habitation, comes to them on the day they get out of one, and move into another. From this arid existence the love of art offers, to most people, the only relief, and none could be more effectual. A man whose family is well and happy, and whose dwelling smiles upon him with a beauty of its own, neither needs nor cares to be rich. If he can earn money enough to feed and clothe himself and his wife and children comfortably, and lay up something for a time of need, he has everything in the way of happiness that the world can bestow. Most people dimly appreciate this, but, never having seen a modest house in which any one could take the smallest pleasure, they imagine that one must be rich enough to buy Bouguereau's pictures, and Italian statuettes, before he can take comfort in life; quite forgetting that a spray of roses, or a pretty child, are worth all the pictures and statues ever made; that it is useless for any one to try to take pleasure in Bouguereau, who

does not know enough of art to prefer Nature to it, and that more real pleasure and contentment can be got, by the man that owns it, out of a beautiful door-knocker, or a well colored room, than most millionnaires now get from the contemplation of the treasures of the Louvre. Of course it is necessary, in order to appreciate art of any kind, however humble, to know something about it, and such appreciation will not become general until the knowledge is more diffused than it is now; but the elevation of a knowledge of art into something worth the notice of a member of Congress will be a great step in advance, and the emulation of the artists who, from every village, will try to obtain Government recompense, will soon do the rest.

THE subject of doing masonry in frosty weather continues to take a good deal of the attention of experts in building. A correspondent of the *Building News* makes a contribution to the discussion by mentioning that the mechanical structure of the mortar is an important factor in determining its resistance to frost, and that "a mortar to resist frost must have a very fine matrix, or, in other words, very minute pores." He says that this quality is given by the use of "smith's ashes finely ground, which have also the advantage of being vesicular." It is not quite clear whether this writer means that the ground smith's ashes should be used in place of sand or not. The term matrix is generally used to indicate the cementing substance by which the coarser particles of mortar or concrete are bound together, that is, in most cases, the lime or cement; and the sand or other comparatively coarse material is known as the "aggregate." If mortar is to have "very minute pores," it would seem necessary to look out for the fineness of the aggregate rather than of the lime or cement, which are naturally fine enough, and it seems probable, therefore, that the ashes are to be used in place of sand. In either case this is a valuable suggestion. Fine sand is, under ordinary circumstances, rather objectionable, but finely-ground brick dust is said, under some circumstances, to be much better than any sand for mixing with lime for mortar, and this would give the fine grain which is considered desirable. Another correspondent of the same journal, speaking of the addition of salt to mortar to prevent it from being injured by frost, objects to it as likely to attract dampness. It is a common notion that lime mortar for plastering, mixed with sand from the seashore, will be damp in certain states of the weather for many years afterward, and architects of the last century in London, if they required Thames sand to be used for mortar, always specified that it should be taken from above London Bridge. This correspondent refers to the use of beer in mortar, and inquires whether the alcohol contained in it is of any service. If so, he thinks that crude alcohol could be obtained for the purpose much more cheaply than beer. We have an idea that the employment of beer in mortar has been pretty conclusively proved to be of doubtful advantage, and it seems hardly likely that so volatile a matter as alcohol could be of any use, but the letter offers a suggestion for future experimenters which may be useful.

THE discussion provoked by the recent theatre fires have developed some useful ideas. At two recent meetings of the Royal Institute of British Architects, papers have been read on theatre construction and comparisons made of the various London theatres from which much is to be learned. It is one of the commonplaces of the ordinary rules for building theatres that a considerable amount of woodwork is necessary in the interior of the auditorium in order to give resonance enough for proper acoustic quality. As is well known, some of the best theatres in the world, from the point of acoustics, are entirely lined with boards and have the floor of the auditorium of wooden construction, purposely arranged with a large air-space beneath it, to form a sort of sounding-board. Of course, such a structure is very combustible, and therefore unsuited to modern ideas, but most architects dread the sharp, disagreeable effect of sound on bare stone or brick walls, and think that some sort of sounding-board effect must necessarily be provided in the auditorium of every theatre. One of the participants in the discussion of the papers expressed the opinion that brick walls could be so lined with wood as to secure resonance without exposing the combustible material to the rapid destruction so much to be feared in theatres, and in this he was undoubtedly right. Another preferred not to use wood at all, but to provide for resonance by linings of incombustible material, held at a little distance from the wall. This, again, might unquestionably be done with plaster on wire lath or with sheets of the wire cloth and asbestos fabrics now made, and such a resource would probably be invaluable for curing harsh echoes in fireproof buildings. There are, however, other less obvious ways of obtaining an excellent effect, if we may judge from the statements made in the course of the discussion. In the Alhambra Theatre, which is the only perfectly incombustible theatre in London with the exception of the very small Terry's Theatre, no wood whatever is used, or any other combustible material, yet very satisfactory resonance was obtained by building the walls of concrete, in which were so many air-spaces as to give the same sort of sympathetic vibration obtained with a wood lining. Every one remembers the antique practice of putting brass or earthenware amphoræ under the seats of the huge stone theatres of Greece and Rome to reinforce the sound, and it seems quite possible that the crevices in concrete, particularly if made, as we believe that at the Alhambra Theatre is, with cinders and similar spongy, porous masses, might have nearly the same effect. In buildings where concrete could not well be used, it is not impossible that linings of porous terra-cotta might be acoustically serviceable, and hollow bricks, of the various shapes now in use, might be very freely introduced in any wall. With walls made dry and resonant by a cellular structure of this sort, and with such ample and convenient exits as the Italian Government now requires, and, perhaps, with Asphaleia stage-fittings, theatres might be made absolutely safe, and the sacrifice of life to amusement, which has been going on since the time of Cæsar, might be stopped.

THE dangers which surround the dwellers in cities, dangers which are harder to detect and more difficult to guard against than those that surround the sailor in the stormiest of oceans, were once more exemplified by an explosion that occurred in Buffalo last week of gas, styled with reporters' customary perspicacity "sewer gas," that had collected in the underground conduits and man-holes of the local telephone company. The workmen whose torch ignited the gas were more or less seriously burned, while the man-hole covers for a distance of several blocks from the centre of the explosion were blown as high as the cornices of adjacent buildings, but, fortunately, crushed no one in their fall. New York towns seem to be in a most eruptive condition of late: Rochester and Binghamton have had explosions in the public sewers and in the cellars of buildings due to the ignition of naphtha gas caused by leakage from the pipes of one of the great oil companies whose pipe-lines pass through the cities, and we are much more inclined to attribute the Buffalo accident to a similar cause than to the reporters' scape-goat. It is satisfactory to know that in the case of one of the earlier accidents the grand-jury found a criminal indictment against the oil company, and in the other case that the city has brought a suit for sixty thousand dollars for damages done to the public sewers. The telegraph and telephone companies may be expected to seize on the Buffalo incident as one more excuse for delay in the process of getting all the wires underground.

THE prospect for the compulsory examination and registration of architects in Great Britain does not at present seem very bright. A bill providing for such examination and registration has been introduced into Parliament, which is intended to apply alike to architects, engineers and surveyors. Not unnaturally, many people think that the draft of the bill must at least have been sanctioned by the Royal Institute of British Architects, and a large number of letters on the subject have been addressed to the Council of the Institute. Instead of replying to them separately, the Council has answered all such inquiries at once by a letter to the *Times*, in which it says that "instead of being drafted, as might reasonably be assumed, by the chartered corporations which represent the three professions affected by it, namely, the Royal Institute of British Architects, the Institution of Civil Engineers, and the Surveyors' Institution, the bill has been drawn up by a committee entitled 'the Architects', Engineers' and Surveyors' Registration Act Committee,' composed of one civil engineer, two lawyers, three doctors and ten architects and surveyors." The letter makes no detailed criticism of the proposed bill, but the statement that only one civil engineer was concerned in the concoction of a statute to be imposed on the whole profession is likely to be quite sufficient to prevent its serious consideration in Parliament.

ITALIAN CITIES — TURIN. — I.

Tower in Zaft-Bommel.

THEOPILE GAUTHIER once said that Italy is the charnel-house of dead cities, and in spite of the reawakening activity which manifests itself throughout the whole peninsula this comparison is not out of place to-day, for no other country can boast the possession of so large a number of cities which once were powerful and opulent, and which the turn of events has reduced to a second or the lowest rank. From a chronological and artistic standpoint, Italian cities must be classed in several catagories by reason of their antiquity, in order that studious travellers may ferret out more rapidly and exactly their historic character and their different values in the domain of art. This classification is not difficult if one merely takes into account the general characteristics which exist in each city. We can, for instance, include in the first category those cities whose principal monuments are related to the Classic epoch, such as Rome, Pompeii, the ancient cities of Sicily, those of Latium, where we find structures of Cyclopean origin, and those of Umbria and Tuscany, which still preserve relics of the Etruscan age. Then come those which have been embellished and enriched with monuments during the ages which followed the fall of Rome and preceded the birth of the Renaissance, and in which we recognize the double imprint of the Gothic manner and the Byzantine style, as well as the jumble of different styles, which, toward the end of that period, began to be mixed with one another. Such are Milan, Ravenna and Venice — mentioning only the most important. The third category must include the cities where are preserved the monuments in which we begin to discern the effort of native artists to enfranchise the Italian school from the yoke of foreign artists, and create a pure and independent style more appropriate to the tastes, the climate, the weather and the the needs of Italy, than those imported by the Greek Byzantine architects, or by the Goths. It is in these monuments that first appears the glimmering of the dawn of the Italian Renaissance: we find them particularly at Pisa, at Florence, in all Umbria and in Emilia. Another category ought to be specially consecrated to the cities which, by their political structure belong to the age of the Renaissance, and almost all the large cities of the peninsula have the right to range themselves in this category, for there is none amongst them which has a past and a history on which we can say that the Renaissance has not left its seal of grace. Finally, the last category may be reserved for the cities of more recent foundation, which, with the exceptions of some isolated specimens of Roman wall or ancient ruin of doubtful authenticity, have never had throughout the vanished ages any truly artistic structure, and only recently have dreamed of giving themselves airs of elegance and assuming to have a monumental aspect. Here the buildings are almost all modern, and allow us to judge of the tendencies to which Italian art has yielded in recent times. Turin offers us the most perfect image of those Italian cities which lack the Classical physiognomy which reigns over almost all the rest of Italy. Naturally, this classification could be only approximately exact, particularly because of the frequency with which we encounter in the same centre, confounded or at least approximated, the traces of the different epochs in a country which has experienced all the glories and all the rebuffs of fortune. But in spite of inevitable uncertainties which are the result of such a mixture, some such classification is necessary for the observer, who, while making a pleasure-trip down the peninsula, desires to acquire certain clear and exact impressions, and thoroughly reliable information upon the different architectural methods which have prevailed in this country during succeeding periods.

Turin is the first great city seen by the traveller who arrives in Italy by the Mt. Cenis tunnel. The population is very active and industrious, and consequently makes rapid progress. Without having achieved the marvelous development which some of the cities of the New World present, it has a very satisfactory growth. In 1377 it contained only 4,200 inhabitants. It now holds 250,000; it is thus one of the most flourishing cities. On its arms it bears the symbol of a bull. The savants have suggested the most contradictory interpretations apropos of this device, while the popular imagination has discovered a most curious even if not the most credible explanation of it. The banks of the Po were formerly infested by a many-headed hydra, which pitilessly devoured every traveller who approached. Those who met the monster face to face died instantly. The Allobroges sent against it an enormous bull, which killed it with its horns, and the citizens in token of gratitude adopted the figure of the liberating beast, and introduced it in the municipal escutcheon. Note here the remote analogy between this legend and that of the head of Medusa.

The Metropolitan Church of Turin is dedicated to St. John, and in the first place was built at the beginning of the seventh century by Agilulphe, a Lombard duke; but it was sacked and destroyed in the course of the wars which desolated Italy during the invasions of the barbarians, so that in 1498 it had to be reconstructed for the second time, after the designs of Pontelli, architect to Pope Sixtus IV. The façade which we see to-day dates back, then, to the end of the fifteenth century. It is almost entirely of Carara marble, and bears no trace of the Gothic style which ruled throughout the sub-Alpine region in preceding centuries. Three portals pierce the façade — full-centered doorways in the Greco-Roman style, which the Italian artists practised in revolt against the architectural methods of the North. Upon each side of the doorways rise two pilasters, which serve to support an attic pierced by two windows. This attic is surmounted by a Greek pediment, and is connected with the two extremities of the plan by two reflex

The Synagogue, Turin.

curves. The interior of the church is divided into three naves, enriched with stucco, gilding and decorations in the style of the Decadence. One of the chapels is enriched with paintings by Albert Dürer, of Nuremburg, and this *chef-d'œuvre* is all the more precious that the relics left by the brush of the grand Nuremburg master are very rare. On another altar is preserved the St. Sicaire, given by Marguerite de Charny to the dukes of Savoy. This relic was first found at Chambery, but the duke Emmanuel Philiberto, having learned that St. Charles Borromeo, in pilgrim garb, was journeying into Savoy to pay it reverence, caused it to be brought to Turin in order that the holy pilgrim might the sooner finish his pilgrimage. The most remarkable things that

this church incloses in the way of decoration are four funerary monuments erected by the order of Charles Albert in honor of Amadeus VIII, Emmanuel Philiberto, Prince Thomas and Charles Emmanuel II, his ancestors. The tomb of Emmanuel Philiberto was executed by the sculptor Pompeo Marchesi. On the front of the die is the ducal coat-of-arms. The statue of the hero is instinct with the pride of manhood: he stands erect, with sword inclined, his glance animated with an expression of hauteur. At the right is the statue of History engraving on the die the words that Munificence standing before her, and supported by an heraldic lion, dictates to her. The mausoleum of Amadeus VIII, the work of Cacciatori, is conceived in a different spirit. The duke afoot, in attitude calm and severe, is supported on one side by Justice and on the other by Felicity. The monument of Charles Emmanuel II, sculptured by Fraccaroli, is distinguished from the others by the eccentricity of its ordonnace and the richness of its ornamentation. It is in character distinctly allegorical, and is composed of three niches, the left-hand one of which contains the statue of Peace represented in the guise of a warrior, who, half-relieved of his armor, is fondly caressing with his disengaged hand the pommel of his sword. The middle niche contains Architecture, symbolized by a woman who holds a tablet on which is engraved a sketch-plan of the cathedral. The one at the right contains the figure of Munificence, here presented under the aspect of a matron attractive of form and sumptuous in attire.

The Cathedral [S. Giovanni Battista]. Turin.

The Church La gran Madre di Dio is one of the most worthy of admiration amongst those which Turin contains. It has all the characteristics of a sanctuary erected in the Grecian style, except the low dome, which rather recalls the tendencies of Greco-Roman architecture. The façade is composed of a vast portico, formed by a range of fluted columns which support a pediment, in the centre of which is represented in bas-relief some religious subject. A flight of steps closed by iron gates leads to the portico, and is enclosed between two rectangular piers surmounted by statues. That which tends to render the effect of this building still more impressive is, that it is erected on the right bank of the Po, facing the bridge which crosses the river, so that he who comes from the opposite side sees rising before him the graceful mass of this edifice which occupies and dominates the centre of the panorama.

The Chapel Corpus Domini is not remarkable in an architectural way, and is worthy of mention only by reason of the singular incident which gave it birth. According to tradition, this occurrence took place in the fifteenth century, at the time when the victorious French ranged through the valley of Susa and savagely ravaged everything in their path. The village Exilles, lying in the road which leads from Mt. Cenis to the capital of Piedmont was one of the places most cruelly misused. A soldier of the army of invasion dared to carry pillage even to the extremity of sacrilege. He took possession of a monstrance containing the consecrated wafer or host, and cast it into a pannier already half-filled with stolen objects. When the donkey upon whom these baskets were loaded reached Turin, he refused to go farther. They flogged him with whips, but in vain. Conquered by pain, he fell on his knees. The monstrance, which was at the bottom of the pannier, burst open, and showed itself to the eyes of the crowd, while the consecrated host detached itself from the frame in which it was fixed, and rose slowly toward heaven. It was in order to preserve the tradition of this miracle that the Commune of Turin erected the Church of Corpus Domini in 1598.

In the number of ecclesiastical buildings which embellish the grand sub-Alpine city, we must not forget the synagogue, which, by its strangely picturesque appearance, gives us the notion of some architectural jewel which the Orient has thrown to Occidental lovers of art. In form it is a parallelopiped, and the four corners are flanked by square towers ornamented by an open belfry, and crowned by a Turkish cupola terminating in a point. Windows and porches are full-centred, but the arch is contracted at the point where it touches the pilasters, just as we see it in Venice in all the monuments where the Arab manner has persisted.

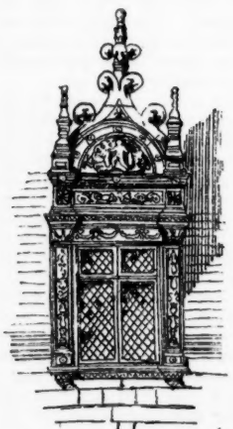
The only open place in Turin which has a truly monumental air is that of San Carlo. The church which gives it its name is formed of two façades, which occupy the extremity of the Via Roma, and form one of the sides of the place. Each of the façades presents a curious mixture of different styles. Statues are mixed up with columns, and the cornice lines are broken from point to point by marble torch-holders, which make the whole design heavy. Detail is lacking in purity, but the whole mass has a sufficiently decorative air. The other sides of the square are enclosed by vast porticos, where the people walk freely, and whose symmetrical disposition greatly pleases the eye. These arcaded constructions are one of the specialties and beauties of Turin. We find them everywhere, and we come upon whole streets — the Rue Po, for example,

built after this pattern, which offer a pleasing aspect without sacrifice of utility. In truth, during the summer the inhabitants find beneath them shade and freshness, while during the cool season they seek under them a protection against the rain, snow and bitter northeast wind from the Alps. We may almost say that the life of the inhabitants unrolls itself entirely under these porticos: it is here they give rendezvous for business, and here that one is sure of finding at a definite hour every day those persons of a certain mark in the procession of daily existence. It is here those who are out of work come to while away the time, and break the monotony of their idleness; and here the poets come to dream and give their imaginations a breathing space.

H. MEREU.

[To be continued.]

SOME GENERAL OBSERVATIONS ON THE STRENGTH AND STABILITY OF MASONRY.[1]—II.



Chateau du Rocher à Mézanger. France

AS to numerical values, the crushing strength of natural stones, tested in the form of cubes, ranges from 4,000 lbs. per square inch for soft sandstones, to 25,000 lbs. per square inch, the strength of some granites and slates. These are about the extreme values met in stones which find their way into general use; it is not probable that this exceptionally high limit of strength is often reached and those of less strength than above mentioned would hardly be regarded as suitable building material in the absence of tests indicating their quality. It will be understood that the strength here referred to has been displayed by material tested under the most favorable conditions for developing high resistance, and if a comparison is made with material tested under other conditions, the fact should be duly considered. Granites of good average quality range in strength from 12,000 to 25,000 lbs. per square inch. Limestones and marbles average between 8,000 and 16,000 lbs. per square inch, with exceptional quarries furnishing stones which reach 22,000 lbs. per square inch. Sandstones range from 4,000 to 16,000 lbs. per square inch, some of the strongest reaching 22,000 lbs.

The investigation of the gain in strength of those stones which are soft and easily worked when first quarried, but which harden during seasoning, has not been undertaken, neither has the effect of hammer-dressing on the surface of the stone been inquired into, although it is very probable that some stones may have had their strength impaired by rough treatment during dressing.

The crushing strength of bricks has been found to range between 5,000 and 22,000 lbs. per square inch, although the strength commonly met is between 10,000 and 16,000 per square inch. Those which had the highest strength were common hard-burned bricks, the softer face bricks gave the lower results. The degree of hardness to which the clay is burnt, at least within limits, exerts a decided influence upon the strength of the bricks, the strength increasing with the hardness.

The range in strength of cements and mortars extends from say 8,000 or 9,000 lbs. per square inch for very strong neat cement down to about 150 or 100 lbs. per square inch, the strength of lime mortar. Intermediate values are found with different compositions of cement and lime mortars and concretes. From the wide range in strength which these materials cover, it will be seen that ample strength exists to meet every reasonable requirement. In order, however, to obtain suitable material in particular cases when a work of great importance is undertaken or where exceptional strength is needed, recourse should be had to experiments on the particular material selected for use.

The compressibility of the material under stress and its resilience when the stress is removed has been referred to, but it is desired to emphasize the importance of giving this feature special attention. In most engineering works the elastic properties of the materials are receiving due consideration, but in the matter of masonry they seem to have been almost entirely neglected. Without implying that knowledge of the ultimate strength is of secondary importance or undertaking any comparison of the relative importance of the several physical properties which obviously vary with changes in the controlling conditions for each particular case, nevertheless, it is of the highest importance to fully understand the behavior of the material within the ordinary working limits, where the elastic properties are the principal ones which are brought into action and about which a knowledge of the ultimate strength alone furnishes no clue. It is desirable to know the effect of each successive load from the commencement up to the time of rupture whenever it is practicable to obtain this, although in ductile materials, having a well-defined elastic limit, there is much uncertainty of behavior between the elastic limit and the ultimate strength. In this respect the behavior of stone is not more complex, perhaps somewhat less, than that of metals.

The moduli of elasticity in the test of the brick piers were found to range from about 700,000 to 2,400,000 lbs. per square inch, depending upon the kind of mortar used in laying the bricks. These values represent the behavior of the bricks and the mortar taken together, without indicating the values of the two taken separately, but from other tests on strong cements and mortars wherein the modulus of elasticity was found between the limits of 1,000,000 and 2,800,000 lbs. per square inch, it may be inferred that the higher values of the moduli of the piers closely indicate the values both for the mortar and for the bricks, and that the lower values in the piers are still rather high for the modulus of weak lime mortars alone.

From a limited number of experiments the following values have been obtained: Sutherland Fall, Mass., marble has shown a modulus of nearly 8,000,000 lbs.; serpentine from Lynnfield, Mass., about 5,000,000 lbs.; some exceptionally-strong red sandstone, 5,000,000 lbs.; other sandstones, weaker in strength and of lower specific gravity, gave moduli from 1,500,000 to 1,800,000 lbs. Experiments have not shown any decided difference between the modulus of elasticity of cement mortar composed of cement and sand and concrete made from it by the addition of broken stones. When a difference happens to exist, there is usually a slightly higher modulus for the concrete as might reasonably be expected, on account of the stones themselves possessing greater rigidity than the mortar.

When structural iron and steel is loaded above the elastic limit by either tensile or compressive stresses, there is ordinarily considerable display of ductility before the ultimate strength is reached, but not so with the materials of masonry. Although there is a certain amount of compressibility in stones including the elastic movement and the permanent set, and sufficient at times to clearly indicate impending rupture, still, as compared with ductile metals, the compressibility is small. The total amount which the different materials of masonry may be compressed previous to rupture range between the limits of about .10 and 1.00 per cent, although by far most material fails when it reaches a total compression of .2 to .7 per cent. We have examples of neat cements failing when the compression amounted to .34 per cent, other cement reaching .60 per cent. Cement mortars have failed with .2 to .4 per cent compression. Concretes have shown a somewhat greater compressibility than their mortars. Some lime-mortar cubes displayed a range of compressibility between the limits of .30 and .75 per cent. Natural stones of different strengths and densities are found to extend over nearly the whole range of compressibility first mentioned. The large compressibility observed in some brick piers laid in lime mortar, where over 1.2 per cent has been reached, of itself indicates that the mortar had been crushed some time before the maximum strength of the pier was reached, which is further confirmed by the appearance of the disintegrated mortar, and furthermore, the strength of the piers largely exceeded the strength of the mortar when the latter was tested in the form of cubes.

As to the modulus of rupture of natural stones under transverse stress not much can be said; experiments are comparatively few. In exceptional cases of remarkable strength, a modulus of 3,000 lbs. per square inch has been reached, although it is quite probable that moduli considerably below 1,000 lbs. are those frequently met in ordinary building stones. These are general values which have been stated, but they fairly indicate what may be expected of this class of building material.

In regard to the practical application of these results of experiments, it is clearly seen wherein attention should be given to certain details in order to secure the uniform distribution of stresses which, in the execution of a well-designed structure is one of the chief features to be attended to. First of all, the foundations obviously require careful attention, the functions which they are required to perform being peculiarly difficult. Occupying a place between a very compressible and heterogeneous mass on the one side, they are expected to receive from the other side loads differing widely in magnitude and in all sorts of places, and must possess sufficient strength and rigidity to transmit and distribute these unequal loads from the mass above without serious distortion. The efficiency of foundations will generally be best when large stones are used in the lower courses, with close joints of uniform thickness, using neat cement for the mortar. The use of large stones lessens the danger of failure by transverse and shearing stresses. To obtain close joints of uniform thickness means flat bed-and-build surfaces by reason of which compressive stresses are uniformly distributed, and the use of strong neat cement gives the nearest approach to the same modulus of elasticity in the joints as in the stones. Such a wall will act as a whole and not as an aggregation of individual parts. Some situations might even make it desirable to employ rolled-iron beams in places where otherwise there would be a lack of rigidity.

It is not always possible to so proportion the sizes of brick piers that the pressures per square inch shall be the same where different loads are carried by different piers, the fixed dimensions of the bricks preventing. Where the loads differ, the compressibility of the piers will be correspondingly unlike unless compensated for by the use of several mixtures of mortar, which, as we have seen, is a convenient method by which the elasticity and compressibility of the

[1] Continued from page 93, No. 635.

pier may be varied within limits. Piers which carry the same loads and differ in height may in the same manner be adapted to their work when it is desirable to have their total compressibility nearly alike. It is not expected that these means will be adequate to secure a strictly-uniform distribution of loads and allow the superstructure precisely the same settlement throughout, due to the action of stresses, but something in this direction may be accomplished.

Bearing in mind the different moduli of elasticity of bricks, stones and of mortars, we can understand the reason why an exterior wall with one kind of facing and another kind of backing is not the best adapted to sustain large pressures, disregarding for the time being the initial strains which result from the setting of the mortar. Parts of walls which are more severely loaded than others, such as arches, require bricks and mortar of extra rigidity. Illustrations might be multiplied, but the fundamental principle consists of the attainment of a uniform distribution of stresses and the uniform elastic resistances of those parts which should act together; having done this, it is improbable that ordinary structures, as commonly designed, will exhibit disfigurement, much less be in danger of true crushing of the material.

That masonry under some conditions will endure great distortion was shown by the loading of an arched floor at the Watertown Arsenal. This floor was about 29′ square and was made of five 15-inch I-beams, 200 lbs. to the yard, carrying brick arches. The beams were 7′ 4.8″ apart on centres, and rested on brick walls 28′ 6″ apart. The rise of the brick arches was 8.5″. Common, rather soft-burned bricks were used, laid on edge with lime mortar. The arches were backed with concrete and planked over. The maximum load carried by this floor was 563 lbs. per square foot, which amounted to a total load of 118,760 lbs. on the middle I-beam. This load caused a gradual and continuous yielding of the beams, which was allowed to continue till the floor was deflected a distance of 13 07″, measured at the centre of the middle beam under the reduced load of 468.88 lbs. per square foot of floor area or 98,884 total lbs. on the beam. Reducing the load still further, to 110.38 lbs. per square foot, the deflection was reduced 2.27″ or to 10.8″. The brickwork endured this great deflection and apparently would have stood much more without failure; the yielding of the iron beams determined the ultimate strength of the floor. While this flooring, which stood in an open area, was being tested, a diurnal variation in its height during clear weather was observed. Measuring from bench-marks in the ground to the under side of the 15″ I-beams, it was noticed that, without change of load on the floor, the east side during the forenoon would rise perceptibly, at noon the south side would rise, and during the afternoon there was a corresponding elevation of the west side. This movement was caused by the greater expansion of the parts shone upon by the sun over those parts in the shade. When the sky was clouded and the temperature of the different parts of the flooring and supporting walls were substantially the same, this movement did not take place. J. E. Howard.

Illustrations

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE POTTER BUILDING, BOYLSTON ST., BOSTON, MASS. MR. S. J. F. THAYER, ARCHITECT, BOSTON, MASS.

[Gelatine print, issued only with the Imperial Edition.]

MARION SOCIAL CLUB-HOUSE, MARION, MASS. MR. WM. GIBBONS PRESTON, ARCHITECT.

THIS building is to be erected during the coming summer by the people of this little seashore town on the shores of Buzzard's Bay. The place is largely peopled by summer guests during the warm season — and as the second floor furnishes a convenient hall for their private theatricals and musicales, the cost of construction will be largely contributed to by their subscriptions. The means of exit from the hall are ample, there being two staircases and a wide exterior fire-escape. The lower story is divided conveniently for the native residents who are members of the club, and provides a place for the book-club, a reading-room, smoking-room, etc. The open fire and supply of current literature never fail to exert a good influence during the winter days and evenings.

A BACHELOR'S HOME, ST. LOUIS, MO. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.

The building is built of Grafton limestone and is finished throughout in quartered white oak. Cost of building was about $15,000.

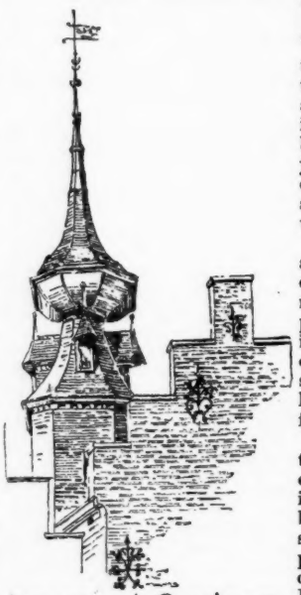
UNITED STATES POST-OFFICE, SPRINGFIELD, MASS. MR. W. A. FRERET, SUPERVISING ARCHITECT, WASHINGTON, D. C.

COMPETITIVE DESIGN FOR THE ROMAN CATHOLIC CHURCH OF ST. AUGUSTINE, BROOKLYN, N. Y. MR. R. L. DAUS, ARCHITECT, BROOKLYN, N. Y.

UNITED STATES COURT-HOUSE AND POST-OFFICE, LOS ANGELES, CAL. MR. W. A. FRERET, SUPERVISING ARCHITECT, WASHINGTON, D. C.

CHURCH, CHAPEL AND PARISH-HOUSE OF ST. JOHN'S, JAMAICA PLAIN, MASS. MESSRS. APPLETON & STEPHENSON, ARCHITECTS, BOSTON, MASS.

LAW IN RELATION TO ARCHITECTS.[1]



House at Cuypers.

EVERY person who professes to be a skilled workman impliedly undertakes to do his work well according to the rules and principles of his art. When a person is employed in a work of skill, the employer buys both his labor and his judgment. He ought not to undertake the work if he cannot, and he should know whether he will succeed or not.

The public profession of an art is a representation and undertaking to all who require and make use of the services of the professed artisan, that the latter is possessed of, and will exercise the ordinary amount of skill and knowledge incident to his particular craft, art, or profession. (Ad. Cont.)

Where a carpenter undertook to build a booth on a race-course, and the booth fell down in the middle of the races from bad materials and bad workmanship, it was held that the carpenter was responsible for the damage that had been sustained. If it could have been shown that the booth had been put up under the supervision of an architect, and that the accident had arisen in consequence only of erroneous principles of building construction, it may safely be averred the liability would have been with the architect. (Ad. Cont. 676.) But if any employer wilfully selects unqualified persons, he cannot have any remedy from them, although they may make mistakes, if they have done their best, notwithstanding that the consequences may be very serious; or, to put the matter more clearly, in the words of an eminent jurist, "If the employer voluntarily employs in one art a man who openly exercises another, his folly has no claim to indulgence, and unless the latter makes false pretension for a special undertaking, no more can be demanded of him than the best of his ability."

An architect or, as he is generally called by legal writers, a surveyor, is bound to exercise reasonable care and skill in executing the work committed to him, and should he neglect so to do, he is not entitled to recover anything for his work. In the case of Moneypenny *vs.* Hartland and others (1 Car. and P. 352), the defendants were a committee for building a Mythe bridge across the Severn. They employed the plaintiff as architect and engineer to the work. He sued them for his fees, but they resisted payment on the ground that though he made an estimate for the bridge, yet he did not examine the soil of the foundation, which was afterwards found to be bad, which caused an additional expense of £1,600, to which the surveyor replied that the defendants themselves had told him that a person whom they named would assist him with information, and that that person had informed him (the architect) that the soil was good; but he admitted he had not himself tried it in any way. The Lord Chief Justice Abbott said, "If a surveyor who makes an estimate sues those who employ him for the value of his services, and it appear that he was so negligent that he did not inform himself by boring or otherwise of the nature of the soil of his foundation, and it turned out to be bad, this goes to his right of action (that is, defeats it); and if he went upon the information of others, which now turns out to be false or insufficient, he must take the consequences, for every person employed as a surveyor must use due diligence; and if the plaintiff went on the information of others, that is no excuse."

A warning was conveyed in Jenkins *vs.* Betham, 15 C. B. 168, to surveyors and valuers when acting in respect of property of a nature to which they are not accustomed. In the case just mentioned the exact point decided was that one who holds himself out as a valuer of ecclesiastical property, though he is not bound to possess a precise and accurate knowledge of the law respecting the valuation of dilapidations as between outgoing and incoming incumbent, is bound to bring to the performance of the duty he undertakes a knowledge

[1] A paper read before the Manchester Architectural Association on Tuesday, February 7, by Mr. Edgar Atkins, solicitor, of Manchester, and printed in *The Architect.*

No. 637 American Architect and Building News, Mar. 10 1888.

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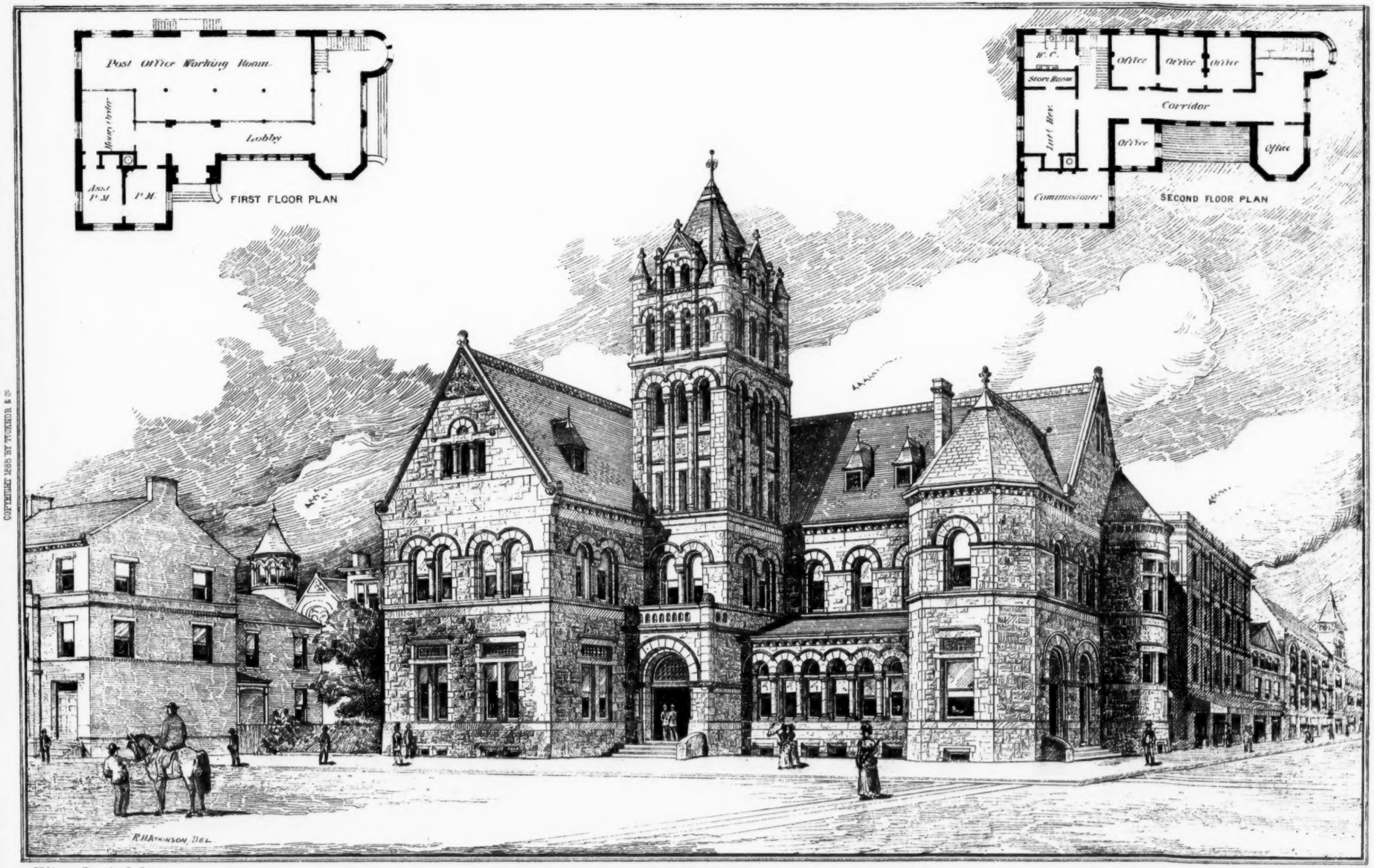

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SPRINGFIELD, MASS

Wm. A. Stark.

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Competitive Design for R.C. CHURCH of ST AUGUSTINE BROOKLYN

R. L. DAUS, Architect N.Y.

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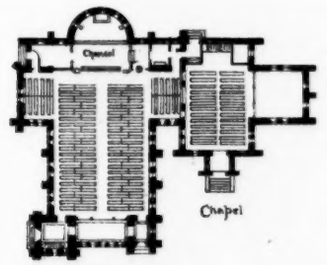
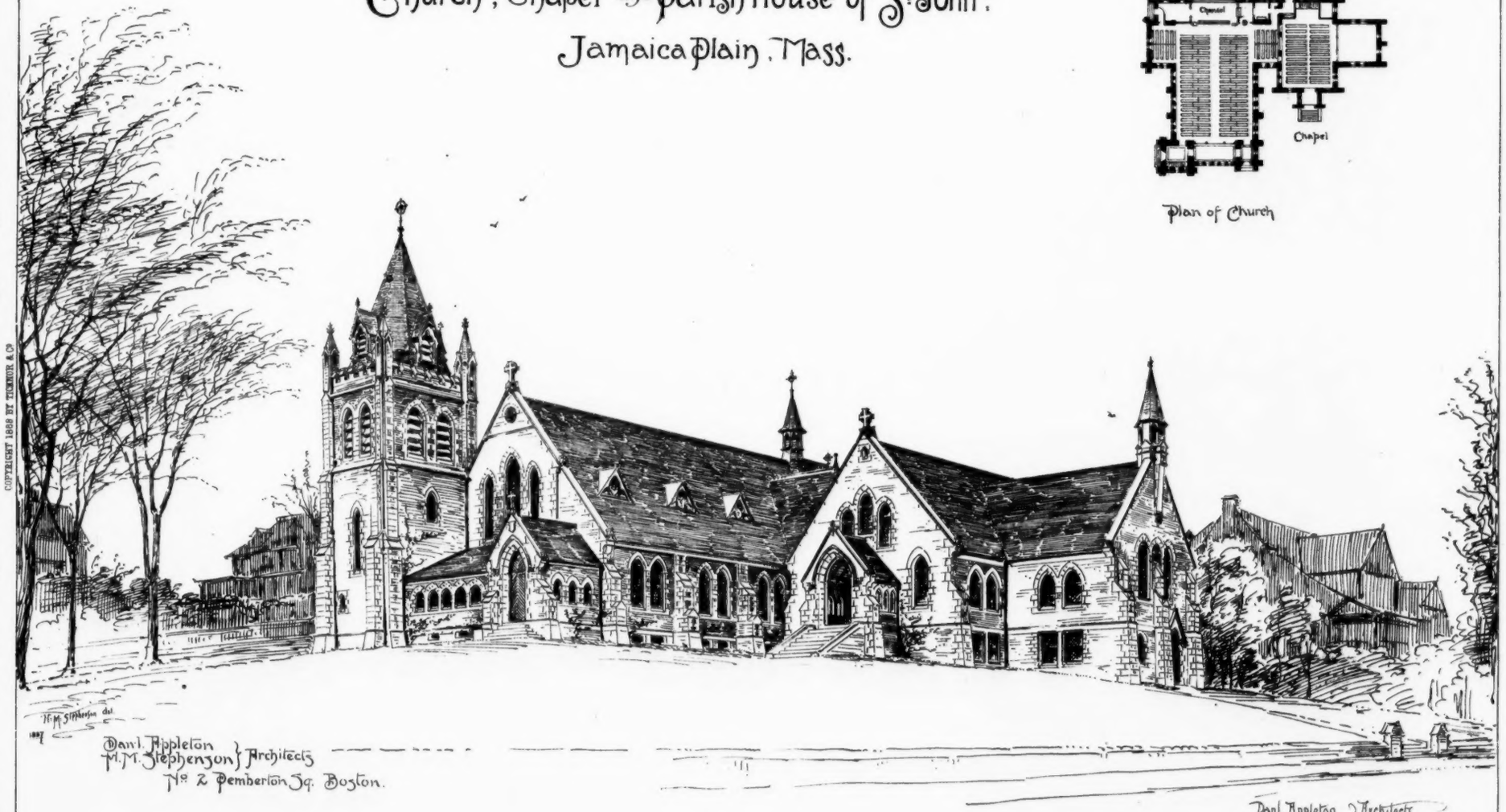
Church, Chapel and Parish House of St. JOHN's.

Jamaica Plain, Mass.



Plan of Church



H. M. Stephenson del 1887

Danl. Appleton
H. M. Stephenson } Architects
No. 2 Pemberton Sq. Boston.

Danl. Appleton
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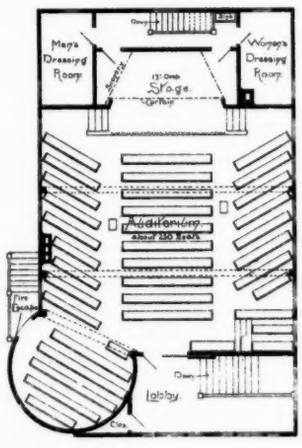
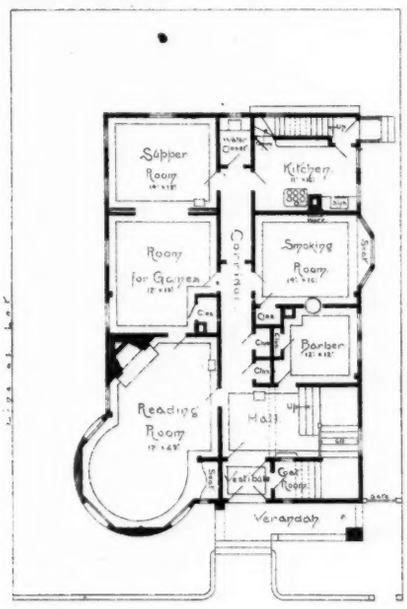


Second Floor Plan



First Floor Plan

MARION SOCIAL CLUB

Wm Gibbons Preston, Architect

Wm Gibbons Preston, Architect. et del. MARION SOCIAL CLUB 1888

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A BACHELORS HOME IN St: LOUIS MO:
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Supervising Architect

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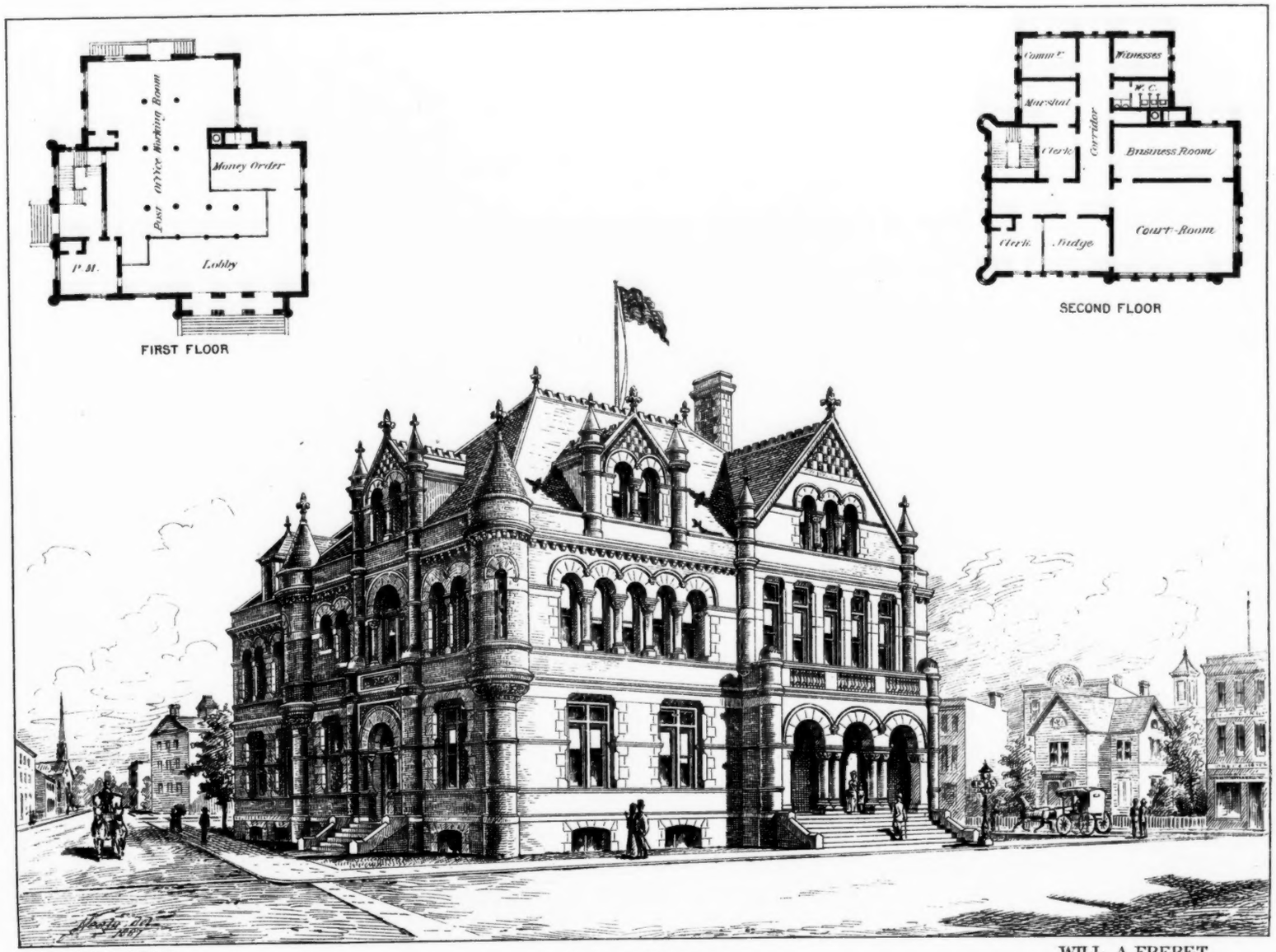

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WILL. A. FRERET
Supervising Architect

of the general rules applicable to the subject, and of the broad distinction which exists between the cases of a valuation as between incoming and outgoing tenant, and a valuation as between incoming and outgoing incumbent.

Another way of putting the point is that the surveyor must be acquainted with any special knowledge which the particular subject of valuation may necessitate.

The case of Jenkins *vs.* Betham just referred to, is quoted by legal writers as an authority for the proposition that a surveyor is liable for the results of his ignorance. There is, no doubt, that he is equally liable for his neglect. Suppose, for instance, a merchant contemplated storing a large quantity of china in a warehouse, and prior to so doing the flooring boards are removed to enable a surveyor to inspect the joists, who, in so doing, omits to observe that they are rotten, he would certainly be liable for any damage resulting to the merchandise in consequence of the condition of the premises.

Surveyors have a most responsible duty to perform when valuing property on behalf of trustees who contemplate lending trust-funds thereon. In the case of Budge *vs.* Gummow, 27 L. J. R. N. S. 666, a London surveyor was employed to value hotel property at Broadstairs. In delivering judgment, L. J. James said, "How could a London surveyor going down to Broadstairs form any estimate of the value?"

Mr. Justice Kay, in a judgment delivered on August 1, 1884 (Fry *vs.* Tapson, 51 L. J. N. S. 325), in a case in which the propriety of a trustee's investment in property in Liverpool was in question, says, "The most incautious act was to employ Mr. ——, of —— & Co., surveyors, land-agents and auctioneers, London, to value for the mortgagees, and to accept his report as sufficient evidence of value." He was a London surveyor, not shown to have any of that local knowledge which was so important in this case, and his employment was inexpedient for that reason.

Clearly, therefore, it is a surveyor's duty to point out to his client that a valuation made by him of property out of his own district is liable to objection, if questions as to the propriety of the investment should hereafter arise.

When trustees contemplate investing in property recent cases have established that the surveyor should be instructed at least as follows:

1. The proposed investors are trustees purposing to invest trust funds.
2. You should ascertain that the particulars of the property given to you are a perfectly correct description of it.
3. You should ascertain its minimum value.
4. Its nature for letting purposes.
5. What are its present rentals, and whether they are such as are likely to continue to be obtainable.
6. Not only should the rentals stated in the particulars be checked, but your opinion of the letting value of the premises should be considered and stated.
7. The amount of the rates and outgoings should be ascertained and stated.
8. Whether or not all the property is let should be ascertained and stated.
9. You should give your consideration to the average amount of repairs which the property is likely to require.
10. It should be borne in mind that should the investors have to take possession, they would have to employ a collector and manager of the property.
11. The possibility of the property being tenanted without regard to the fluctuation of trade should be considered.
12. If any special circumstances affect the property, mention thereof should also be specifically made.

It is laid down by very high authority that the office of an arbitrator (to which members of your body are so frequently appointed) is deemed to be an honorary office, and a person who acts as such cannot charge for his services, unless it appears from the terms of the submission or the surrounding circumstances of the transaction that it was the intention of the parties that the arbitrator should be paid for his time and trouble, or unless there was an express promise to pay him for his services. (Ad. Cont. 661 *f.*)

It may be doubted, however, whether or not that is still the law, because in a recent case — Crampton & Holt *vs.* Ridley & Co. (*Law Times Reports*, February 4, 1888) — Mr. Justice Smith says: "If the point ever comes to be decided by a court of review . . . it will be held, and I believe the law to be that . . . there is an implied promise to pay the arbitrators and umpire."

The remuneration payable to surveyors does not even yet appear to be definitely fixed. It is a matter of common knowledge that for supervision of buildings it is usually on a percentage scale, but an inquiry into the cases would not justify an assertion that the law was that they should be so paid. In the case of Upsdell *vs.* Stewart (Peake), 255, the plaintiff claimed £34, being £5 per cent on all money charged by and allowed to the tradesmen. The defendant had paid one-half of the sum demanded into court, contending that two-and-one-half per cent was a sufficient compensation for the business the plaintiff had done. He had done nothing more than measure the work and settle the bills, not being at all employed in building the house. Plaintiff's counsel offered to call witnesses to prove that the uniform practice of surveyors was to charge £5 per cent on all money allowed to the workmen, but the Chief Justice, Lord Kenyon, said, "The plaintiff is entitled to a reasonable compensation for his labor, but he is not to estimate that by the money laid out by the defendant in finishing his building. As to the custom offered to be proved, the course of robbery on Bagshot Heath might as well be proved, in a court of justice."

But now observe the case when the work had been done under the supervision of the architect. In the earlier trial, Chapman *vs.* De Tasht, in which the question was whether the plaintiff, who had been employed by the defendant as surveyor in superintending certain alterations in his buildings, was entitled to a commission of five per cent on the sums laid out as surveyors, although evidence was given that such was the usual mode of charging for business of that description, Lord Ellenborough declined to lay it down as law that such was a proper basis of charge, but, to use his own words, he left it to the jury to say whether this mode of charging was vicious or unreasonable, and, if they thought it was, to deduct accordingly. The jury found a verdict for the plaintiff for the full amount claimed. It would seem, perhaps, to the lay mind that this case established the right of the profession to payment on a percentage scale. But that is not so. We must bear in mind that the legal effect of Lord Ellenborough's action when trying the case was the same as if he had said, "Gentlemen of the jury, the law is not that a surveyor shall be paid five per cent commission, but it is that he shall be paid a reasonable sum, and if in your judgment a sum calculated on that basis is unreasonable, you may bring in a verdict awarding the plaintiff a smaller sum."

The practice of surveyors[1] to charge on a percentage scale has been so long established, that it may be predicted a defendant would have the greatest difficulty in defeating a claim so computed. That an architect is entitled to be paid fees for acting as a skilled witness has been long established. A person, may, however, by express agreement not only render the amount of remuneration which is to be paid dependent on the amount of contingent benefit to be derived by the employer, but he may defer the period when his right to receive the reward shall accrue until the employer has actually obtained a given advantage. (Ch. Cont.)

In Paine *vs.* Guardians of Strand Union (8 Q. B. Ad. & Ell, 326) it was held that the guardians of a poor-law union could not bind themselves by a contract without seal, if they could in any manner contract to remunerate a surveyor for attending as a witness on appeal against a parochial assessment within the union, nor for making a survey and map of the rateable property in a parish forming part of the union.

By 33 & 34 Vic. c. 75 (Elementary Education Act, 1870), s. 30, subs. 1, a School Board shall be a body corporate, having a perpetual succession and a common seal. . . . Subs. 4. Any minute made of proceedings at meetings of the School Board if signed . . . by the chairman shall be receivable in evidence in all legal proceedings without further proof. . . . Subs. 6. The rules contained in the third schedule shall be observed. By section 35, a School Board may appoint a clerk and a treasurer and other necessary officers. . . . By the third schedule, the appointment of any officer of the Board may be made by a minute of the Board, signed by the chairman of the Board, and any appointment so made shall be as valid as if made under the seal of the Board. By a minute signed by the chairman of a School Board and countersigned by the clerk, the plaintiff was appointed architect of the Board, and did work under orders given by subsequent minutes so signed and countersigned and communicated to him. It was held by Mr. Justice Mathew that by virtue of the provisions of the Act he was entitled to receive payment for his services, although the appointment and orders were not under seal. (Scott *vs.* Great and Little Clifton School Board, 14 Q. B. D. 500, 52 L. T. 105.) This case must not be taken as establishing that an architect may safely act for a corporate body without his appointment being under seal; but rather, that if he do so, he runs great risk of having no legal claim for payment.

Whilst it is not intended in this paper to discuss the law either of light or of building contracts, neither of which is strictly within the scope of its title, there are a few points in the latter subject in which the personality of the architect is so distinctly marked, that it will be desirable briefly to refer to them.

In contracts in which the right to receive payment is made dependent on the approval of the architect, no right can be enforced until that approval is obtained. This point has been affirmed in several cases, amongst others, Scott *v.* Liverpool Corporation, and Salford Corporation *v.* Ackers. It therefore follows that in such cases work not done to the satisfaction of the architect cannot be charged for; thus, where the contract was to fit a ship to the entire satisfaction of the surveyor of the Emigrant Commissioners, Mr. Justice Willes, in delivering judgment, speaking of certain disputed work, says that which was first done was not done to the satisfaction of the surveyor, and therefore is not to be paid for under the contract. (Dobson *v.* Hudson, 1 C. B. N. S. 659). The builder would, if the law stopped there, seem to be wholly at the mercy of the architect, but that such is not the case was very clearly established in Scott *v.* Corporation of Liverpool, previously referred to. There the contract provided, amongst other things, that in case of disputes such disputes should be decided by the engineer of the Corporation, and that it should not be competent to the plaintiffs or the Corporation to except at law or in equity to any hearing or determination or certificate of the said engineer, who should not be required or compellable by any proceeding

[1] In this paper the word "surveyor" is generally used for architect.

whatsoever, either at law or in equity or otherwise, to answer or explain any matter touching or relating to any certificate made by him. In spite of this, the plaintiffs commenced legal proceedings against the Corporation and their engineer, and in their bill of complaint stated that a certain portion of the works had been completed by the plaintiffs, but the engineer, acting under the directions and in collusion with the Corporation, withheld his certificate of such completion, and thereby prevented the plaintiffs from recovering payment therefor, and that he also, under the like direction, refused to act as arbitrator according to the terms of the contract, and prayed that the Court might adjudge that the withholding of the certificate by the engineer was a fraud upon the plaintiffs, and that the plaintiffs were entitled to receive such an amount of money as they would have been entitled to if such certificate had been granted. It was contended, on behalf of the Corporation, that the plaintiffs were, by the express words of the contract, precluded from recourse to the Law Courts. Vice-Chancellor Stuart, who heard the objection, at the conclusion of the arguments of the counsel for the Corporation, intimated that he did not require counsel for the plaintiffs to say anything in support of their case, and proceeded to give judgment in Scott's favor, in the course of which he said, "I conceive there is just ground for maintaining such a bill for equitable relief, not only against the parties to the contract, who are bound to pay, but also against the engineer himself. . . . These are allegations of improper and inequitable acts and omissions against the engineer. . . . There is, in this contract, a stipulation which purports directly and positively to exclude the jurisdiction of any Court with reference to the conduct of the engineer, however fraudulent and improper—a stipulation of an extraordinary and improper kind, if it bears the construction contended for by the defendant, the engineer, and in no case in which improper conduct or inequitable conduct on the part of the individual in whose favor a stipulation of such a character is made, shall I treat it as having any operation." It should be added that this judgment was not delivered as the result of the trial of the action, but upon a preliminary application to the Court to refuse to hear it. Ultimately the case on the facts was decided in favor of the Corporation and their engineer. If the architect's certificate is wrongfully withheld, the Court will give relief, not only against the employer, but also against the surveyor, and a stipulation purporting to exclude the jurisdiction of the Courts in respect of his conduct will be set aside. (Ad. Cont. 667.) Active collusion, it would seem, is not necessary to render the surveyor liable to such an action; it may be maintained by the builder if he has fulfilled his contract, and the architect, with full knowledge thereof, has neglected to certify in collusion with the surveyor.

The position of the surveyor under building contracts is that of a quasi-judge, and, whilst protecting his client from imposition by the builder, he must also act perfectly fairly towards the latter, and, if unknown to the builder, the surveyor has a personal interest adverse to him, or acts unfairly, partially, or corruptly, in spite of all efforts to exclude its jurisdiction, the Court will interfere. Thus, in the case of Kimberly *v.* Dick, L. R. 13 Eq. 1, where the facts were that an architect entered into an undertaking that a house should be erected for a sum not exceeding £15,000, including architect's commission and all expenses, and engaged the services of a builder who, without being informed of the undertaking, gave an estimate based on quantities given him by the architect, and entered into a contract with the employer for the completion of the work from the architect's plans and under his superintendence for £13,690, with power for the architect to order extra work, and with a clause providing that all questions between the parties under the contract should be settled by the award of the architect, on a suit by the builder claiming to be entitled to be paid by the employer for all quantities executed by him beyond those included in his estimate, and for extra works, it was decided that on the evidence the architect was the agent of the employer, that his undertaking having been concealed from the builder, the arbitration clause in the contract could not be enforced, and that the plaintiff was entitled to an account for what was due to him for any works executed by him under the architect's direction not included in the contract, and for any works so executed under the contract, the price for which was not therein included, and for any variations made under the architect's direction of works included in the contract.

The principle of this case has been confirmed in those of Kemp *v.* Rose, 1 Giff. 258; Ormes *v.* Beadel, 2 Giff. 166; Pawley *v.* Turnbull, 3 Giff. 70; Bliss *v.* Smith, 34 Beav. 508. In Kemp *v.* Rose, where the facts were very similar to those in the case of Kimberley *v.* Dick, Vice-Chancellor Stuart says that if there was the smallest speck or circumstance which might unfairly bias the architect's judgment, his decision cannot be absolutely binding upon the contracting party.

It was held in Roberts *v.* Watkins, 14 C. B. N. S. 592, that if the architect's certificate is not by the express terms of the contract required to be in writing, his verbal approval is sufficient. The utmost care is required in granting the certificate, because it is said that when once given, the surveyor is *functus officio*, and cannot vary or alter it. (Jones *v.* Jones, 17 L. J. Q. B. 170).

An action will not lie against an architect by the builder for want of skill in ascertaining the amount to be paid to a builder under a contract, if his error be only an error of judgment and is free from fraud or collusion.

Building contracts, says Mr. Addison, have not been construed by the Court to be binding to the letter, so as to enable a land-owner to escape payment for the benefit of the builder's work merely on the ground of a slight deviation, but if it appears that the parties to the contract intended the one to insist on, and the other to submit to, conditions, however oppressive, the Court will give effect to them as illustrated by the cases of Stadhart *v.* Lee, 3 B. and S. 364, 32 L. J. Q. B. 75; Jones *v.* St. John's College, L. R. 6, Q. B. 115.

In Stadhart *v.* Lee, L. J. R. Q. B. 32, N. S. 75, the facts were that, by a contract of work as to certain excavations to be done at so much per cubic foot by the plaintiff for the defendants, the plaintiff agreed to execute the work to the entire satisfaction of the engineer and clerk-of-the-works appointed by the Metropolitan Board of Works, as well as to the satisfaction of the defendants or their agent, provided that if the works should not proceed as rapidly and satisfactorily as required by the defendants or their agent, they should have full power to enter upon and take possession of the works, and pay whatever number of men should be left unpaid by the plaintiff, and might set to work any number of men they might consider necessary, and the amount so paid, and the costs of the men so set to work, should be deducted from whatever money should be due to the plaintiff. To an action for work and labor the defendants pleaded that the work had not proceeded as rapidly as they and their agent required, and that they had therefore acted on the proviso, claiming to deduct the costs so incurred from the plaintiff's demand, to which the plaintiff replied that the works did proceed as rapidly and satisfactorily as the defendants reasonably and properly could require, and that the defendants and their agent unreasonably, improperly, and capriciously required the work to proceed as in the plea alleged. Held, that the intention to be collected from the agreement was, that the defendants, if dissatisfied, whether with or without sufficient reason, with the progress of the work, should have the absolute and unqualified power to put on additional hands and get the work done, and deduct the cost from the contract price payable to the plaintiff, and, therefore, that so long as the defendants were acting *bona fide* under an honest sense of dissatisfaction, although it might be ill-founded and unreasonable, they are entitled to insist on the proviso, and, consequently, that the replication which only alleged that the dissatisfaction was unreasonable and capricious, and did not allege *mala fides*, was no answer to the plea.

If the workman is entitled to payment from time to time as the work proceeds, the destruction of the work before its completion will not deprive the workmen of their hire. But if the contract is an entire and indivisible contract for the building of one house for a specific sum to be paid on its completion, and the edifice is destroyed by lightning, fire, or tempest during the progress of the work, the contractor must stand to the loss and be himself at the expense of repairing the damage (Ad. Cont.)

But if the contract price of the building is to be paid by instalments on the completion of certain specified portions of the work, each instalment becomes a debt due to the builder as the particular portion specified is completed. And if the house is destroyed by accident, the employer would be bound to pay the instalments then due, but would not be liable for the intermediate labor and materials.

The preparation of the contract for the execution of the works is a task frequently undertaken by members of your profession. It must be borne in mind that a man who enters into the work of building embarks upon the most treacherous and stormy of seas and is fearfully and wonderfully in the builder's hands, who is often, perhaps generally, impecunious, and it is therefore necessary, however harsh it may seem, to protect the land-owner at all points. As a rule, the builder does not incur risk of monetary loss from him.

Two points should in all such contracts have careful attention. First, the builder should always be required to deposit a copy of the detail estimate on which the contract is based for the purpose of pricing extras. Secondly, the whole of the conditions should be set out in the contract, and not scattered promiscuously throughout the specification.

This is really a most important matter and it involves the possibility of the two documents absolutely contradicting each other—a state of things fraught with far more serious consequences to the client than the omission of conditions.

The Legislature has in several instances recognized your profession. Time does not allow of an exhaustive inquiry on this point, and two instances must suffice, in both which you are, in effect, constituted judges. Under the Ecclesiastical Dilapidations Act, 1871, the archdeacons and rural deans of each diocese were required to elect a surveyor to assess dilapidations. He is to make a report as to the cost of repairing the same, upon which the bishop may make an order, and if the report be not disputed in manner directed by the Act, the sum stated in the order as the cost of the repairs shall be a debt due from the late incumbent, his executors or administrators, to the new incumbent, and shall be recoverable as such both at law and in equity. By the same Act, power is vested in the surveyor to enter and inspect buildings at seasonable times and within seasonable hours, and by Section 46 the surveyor's certificate of the final completion of the works is conclusive evidence of their due execution.

Under the recent settled Land Act, 1882, if the tenant for life is desirous that capital money may be applied in an improvement of the settled property, the Court may, if it thinks fit, on the report of a competent engineer or able practical surveyor, make an order for the application of the money in payment of the work comprised in the improvement.

BOOKS AND PAPERS.

IF the prime object of the history of architecture is to make clear the lines of growth, and to show how art in general has been influenced by the erection of architectural structures, Mr. Tuckerman's recent history[1] is anything but a success. The main facts of the history of architecture are stated generally as fully as could be expected in a little volume of less than two hundred pages. Besides this, the history is presented in a very readable manner, though for that matter, it must be a poor hand, indeed, which could not evolve an interest from so vast and comprehensive a subject. But the real soul of architecture, the appreciation of the divine fire, which marks the difference between mere building and true art is quite lacking in this work. The author undertook a tremendous job when he started out to write a short history of architecture, and he greatly increased the difficulties of his subject by following essentially the same lines as have been adopted by such exhaustive writers as Fergusson and Lübke. It is a work written to meet the popular desire for knowledge on professional points. It is not in any sense a book for architects or students, though this does not necessarily imply that the work could not be read to advantage by amateurs. The statements are generally correct and the few criticisms which are offered are harmless, if not absolutely warranted, and in so far as it is really a history of the leading facts connected with architecture, it would repay the reading of those who desire only a superficial acquaintance with architecture. As to its influence in moulding the taste of its readers and guiding them to a knowledge and appreciation of what is really good, and why it is good, and what the best work is, the book is absolutely at fault. Nothing of that sort could fairly be expected from so fragmentary a work.

The book is, however, not lacking in some good points in addition to the mere statement of facts. The illustrations, which are very few in number, are well chosen, cleanly drawn, and have the appearance of having been made especially for this work, as they doubtless were. They are far better than one would expect from a book of this description, even though it does bear the name of Charles Scribner's Sons as publishers. The temptation, to a writer on architecture, to borrow nowadays is so strong that few have the strength to resist it, and the result is that the majority of the smaller architectural histories are filled with weak, trashy illustrations, copied from the German, or copied from no source of any value, whose influence is bad where it is not harmless. Mr. Tuckerman has wisely refrained from any general views of buildings, with the exception of a rather poor sketch of the central portal of the church of St. Trophime at Arles. Unless views are thoroughly good they are quite as apt to mislead as to help. The illustrations are confined entirely to a few diagrams of the orders and some well selected plans of the most characteristic buildings of the different epochs; quite enough in number to illustrate the different styles, but not so many as to encumber the volume or bewilder the pupils. We should say, after reading the book, Mr. Tuckerman understands architecture much better than he is able to present it, for the book is professionally trite and commonplace in the extreme, and the subject-matter is treated entirely without enthusiasm or genuine art impulse, though the buildings chosen as types show that the leading ideas of the history of architecture were fully appreciated by the writer, and that his judgment in regard to what to study was not at fault.

It seems to us, that one serious mistake of the work is the attempt to crowd all of modern architecture, including the Renaissance into less than ten pages, while Celtic, Egyptian and Asiatic Architecture occupy together sixty-one pages and the Gothic alone nineteen out of a total of one hundred and sixty-eight. We fancy most readers would prefer to know more about modern work and would be more anxious to understand the Renaissance than to know the exact meaning and significance of certain Druid or Asiatic remains that no one sees or ever cares much about.

IN these days of dilletante amateurs, when every one wants to know all that is to be known about art, a concise architectural history is often asked for. A very good attempt in this direction is a recent work by Miss Beale, a writer who is well known to readers of this journal. The aim of the author is well stated in her own words[2]: "The utmost I hope or wish to do is to give some love of art which will enable the reader to take an interest in the subject, when travelling, which will, in fact, render them intelligent amateurs in the true sense of the word — *lovers of Art*, not in its perverted sense of *bad workmen dabbling in Art*. Life is not long enough to learn everything perfectly, nor in such a subject as architecture is it even needful. To an amateur, a thorough knowledge of the art of construction is no more necessary to a due appreciation of a building than a knowledge of the chemistry of color is necessary to the enjoyment of a fine painting."

With such an aim and such a purpose kept constantly in view, any work on architecture ought to be valuable to amateurs.

Miss Beale has been most happy in her division of the subject-matter; indeed, we do not remember to have seen such a division anywhere else, and it commends itself at once for its truthfulness and for the way in which, under a few heads, all architecture is embraced. Her work is divided into six divisions. First, is an introduction, describing in brief the various portions of a building, with illustrations. Then architectual history as a whole is divided into four parts; first, the Trabeated or Beam Architecture, including Egypt, Chaldea, Assyria, Persia, India, China, Japan, Asia Minor, Greece and Sicily. Second, Round-Arch Architecture, including Italy, Rome, Early Christian, Byzantine, Romanesque, Norman and Saracenic. Third, Pointed or Gothic Architecture, and fourth, Renaissance. Miss Beale adds a final chapter of architectual examples, which may be studied in London in connection with her work.

The author tells us that the work originally formed the substance of lectures which were delivered to her art pupils, girls between the ages of twelve and eighteen. It is a little too paternal and dogmatic in some parts, a feature which we fancy would not suit some of our exacting amateurs of to-day in every respect, but, on the whole, it is so easily comprehended and written in so straightforward a manner that no one can fail to appreciate it. It might be said that the work does not show the sequence of architectural growth, and that there is no nice distinction in style maintained, as for instance, when she says that the Arc de Triomphe de l Etoile is a copy of a Roman triumphal arch, without explaining the immense difference in style which separates the two. Perhaps it would not be worth while to delve too deeply into the soul of art while writing an Amateur's Guide to Architecture. Certainly while the work confines itself to the mere descriptions or enumerations of architectural works, it is admirably clear-sighted and logical, but for comments or criticisms upon architectural growth or on questions of taste as regards individual buildings we fancy most readers would not be altogether satisfied with what the work offers. The author would seem to be almost prepossessed in favor of the Gothic as against the other styles of architecture, and like all Gothicists sees good in mediæval work and faults in everything else. For instance, she says, "The simplicity of Greek buildings requires strong effects of light and shade only to be had in a sunny country. If you want to see how gloomy such a building can look without such effects, you have only to walk to the British Museum, the dismalest of dismal London buildings. On the other hand, Westminster Abbey, with its wealth of ornaments exactly suits our dirty and dingy atmosphere."

Most of us who have seen Westminster Abbey are perhaps more inclined to look upon its numerous crockets and carvings as being rather unsuited for resisting the dirt and destructive corrosion of the London atmosphere. Again, an unjust comparison is made in one place by claiming that in Gothic architecture the great object was to make everything, however mean its use, ornamental, while in Renaissance the one idea was concealment, a statement which is only true in a measure and is by no means true in principle or in sentiment. She relates the story from Vitruvius about the origin of the Corinthian capital and the mythological acanthus plant which grew under a basket placed over a tomb. We cannot believe that the Greeks were so feeble in their art growth as to find no better excuse for ornament than would be suggested by such a puerile fable as this. All architectural ornament has been a growth; has never been due to accident or caprice, but has followed just as definite laws as construction or planning, and it surely is not wise, in an amateur's guide, to draw architectural traditions from mere fables.

The work is, of course, much crowded, though the general scheme is so excellent, that the author has been enabled to grasp the entire subject to an extent which is beyond the powers of most writers of this kind of work. But small space is given to modern work. Most students of architecture would be more interested in the things of to-day than in the things of very remote generations. Indeed, we question whether the most successful history of architecture is not to be that which is written analytically, taking buildings and styles as they are and tracing them back to their origin, instead of starting from the fountain head and spreading out over the whole world. However, it is not fair to judge Miss Beale's work by any standards which would be applicable to larger and more elaborate publications. For what it professes to be, it is really excellent, and we would advise all newspaper reporters who desire to know the difference between a round arch and an iron beam, to read Miss Beale's work before they undertake to criticise public buildings.

THE new post-office ruling affecting the admission of "second-class" matter to the mails falls upon the just and the unjust with equal severity, and the public will probably suffer more by an unnecessary ruling than it will gain. This ruling denies the advantages of "pound rates" to various series of paper-covered novels, good, bad and indifferent, which for years have been admitted to the mails at such a rate that the public could obtain reading-matter at a rate which it will not be possible for publishers to furnish it at so long as the present ruling holds.

However hardly this ruling may bear on the publishers whose issues are of a general and miscellaneous type, such as those published by Harper & Bros., Ticknor & Co., Houghton, Mifflin & Co., there are other less known publishers who have made use of the pound rates in a way that is deserving of special protection, and we believe

[1] "*A Short History of Architecture*," by Arthur Lyman Tuckerman. New York: Charles Scribner's Sons.

[2] "*The Amateur's Guide to Architecture*," by S. Sophia Beale. London: J. S. Virtue and Co.

that *Cassell's National Library* is one and the "*Elzevir Library*" is another. One of the latest things undertaken by the publisher of this "*Library*" is "*Alden's Manifold Cyclopædia*,"[1] parts of which are now and then issued in this form. Judging by the specimens before us this "*Cyclopædia*" will be not only extraordinarily cheap but the publisher may well claim that great pains have been taken to make the articles accurate and full. Of course, one cannot expect to get extra heavy paper and fine binding when he undertakes to buy for less than ten dollars the thirty volumes of five or six hundred pages each that the publisher offers, but the paper is good enough for the money, the type has certainly a good and clear face, and the meagreness of the margin simply makes the book easier and lighter to hold in the hand. It looks as if with sufficient support the publishers might be able to produce a good "*Cyclopædia*," which would be cheap enough for most of us to own.

COMMUNICATIONS

DECORATION OF McVICKER'S THEATRE, CHICAGO.

Chicago, Ill., February 25, 1888.

To the Editors of the American Architect:—

Dear Sirs,—I reply at some length to Messrs. Adler & Sullivan's February letter of the 1st, for all they say being not all there is, makes them, I fear, mislead themselves, and I wish to state the manner in which I came to undertake the decoration of this theatre, and what I did to justify my claims of January the 18th in your issue of the 28th.

Personally invited by Mr. McVicker to examine plans at Messrs. Adler & Sullivan's office made for the alterations — the architect's notice coming later in the usual way — I called, but the set of drawings was incomplete, sketches of sounding-boards and boxes having been distributed among other decorators. I learned then and subsequently that plaster panels inserted into wood framing — to form a proscenium front with boxes combined — were to be decorated in connection with the entire interior, which interior needed no plans to see, the changes being slight and then in view. I discussed at length with Messrs. Adler & Sullivan their style, to get its meaning, giving as reasons my desire for coöperation, and, in furtherance of this, together we agreed that this peculiar style demanded soft and gentle color-treatment. Upon deliberation that night, and alone, I mentally measured the ponderous timberings and delicate lines interblended in grotesque oppose, and I turned my mind fixedly to the idea of one ruling tone, changed by light and shade, as the groundwork for my plan. The next morning, in Mr. McGrath's private office, I gave to Mr. McVicker the scheme of color in these words: Start from the floor with a reddish brown and gradually pale to the entire height of the building lighter and lighter, reaching the centre of the ceiling in delicate creams; and I may here say, this was the first occasion on which any scheme of color or system of decoration for the body of the house had been enunciated. Mr. McVicker approved and recommended that I explain this to Messrs. Adler & Sullivan, and such was done on a second visit to their rooms. Neither suggestion, nor idea, nor wishes for this treatment came to me from them other than is here stated. A few days later I obtained two or three plaster panels from a storehouse — they being not yet in place, nor was the building ready to receive them — to serve me as a keynote to designs that were required of me, and from the spirit of these I produced a colored sketch of the ceiling, a small section of the cove proper and I think a bit of the cove under the balcony; ultimately, a variety of ornaments in relief, which will be referred to later, the whole of which culminated in the work as it now stands. To illustrate my scheme of color, a screen covered with raised flock paper was colored in the graded manner proposed, for until then this treatment had never been seen or heard of, and required demonstration. Mr. McVicker awarded the commission for the work to Mr. McGrath (the architect's notice may have reached before or not, I cannot say), and while some trivial change to the ceiling cove suggested by the architects was noted, I may add that these preliminary studies simply served as a basis for operations, that I made many changes as the work proceeded, always without reference either to Messrs. Adler & Sullivan or Mr. McVicker, the work being placed unreservedly in my hands.

My specification contained a full description of this color scheme, somewhat as follows: Color for plaster ornaments in vestibule, red, to mass with the mahogany woodwork, and garnish with fire-gilt bronze; color for foyers, blue and russet and gold in harmonious contrast to the vestibule, and to fully prepare the eye for the burst of red and yellow browns of the auditorium. No such idea, wishes or suggestion appeared in the architects' writings; theirs were the usual stipulations as to number of coats of paint or varnish, and some admonition in a general way not plain in my memory now, nor were they instructive to my idea of what this work should be. These specifications were not criticised or changed in any way whatever by the architects, and it may therefore be assumed that I am the sole author of that scheme of design for the decoration.

[1] "*Alden's Manifold Cyclopædia.*" New York: John B. Alden, publisher.

The responsibility of the decorator to the owner, however great, is small in reality when compared to that he owes to the architect. The architect it is who formulates a style — if good, it must be reached up to, if bad it should be bettered, quietly and unobserved — not to be lost sight of. In regard to that, it is the aim of every man who builds a house to build it to its use, and when the decorative theme is reached, architect and decorator must be in full accord.

I would ask in the face of my effort to coöperate with the architects, why they seek to disparage such portions of the work as were produced by me? Why are they "caricatures"? Mr. Blackall did not see them as such; on the contrary, he intelligently commends them and gives his greatest praise where I shall prove the architects had no control, for this work covers the ceilings and walls of foyers, staircases and the whole of the auditorium, except sounding-board and boxes.

"The correct statement of the case" is this. The architects designed the proscenium, the boxes and the vestibules, so far as the construction and relief-work is concerned. The placing of the electric-lights in the proscenium and vestibules was arranged by the architects. The building was then handed over to me, the walls being bare, the ceilings bare, the staircases and foyers bare, and every part of the building without color or decoration of any kind. I designed the relief-work throughout the whole portion of the building which they had left incomplete, planned the arrangement of two hundred and seventy-eight electric-lights (adding about one hundred to the "definitely determined" number), conceived the whole scheme of color decoration throughout, including the portions constructed and designed by the architects, and carried out the whole of this work without any personal communication with them whatever, except what I have already stated, or where some question of construction interfered with my advance, their office in the matter being limited to the acceptance of my design, the signing of a contract, and the granting of a final certificate when the work was completed.

The wall-paper design was Mr. McGrath's by purchase and I chose it just as I did the lincrusta-walton and all other materials, without consulting the idea, wishes or suggestions of the architects. The decorator is no less the artist or no less deserving credit for his work, when, to unify the whole, he takes the fabric suited to his want. That this paper was designed by Messrs. Adler & Sullivan, though for no particular purpose and subject to my criticism, may be to their credit. That it was my voluntary act to select it for this work should be to my credit. The skilled decorator chooses what he will and makes his plans; it is that judgment a client buys in this profession. The upholstered dado, following round the walls of the auditorium and staircases to the boxes, with its unique upholstering and trimmings, the draperies in the boxes and all the portières, were controlled by me in both color and design, and the materials were submitted to me to be approved. The makers of the stained-glass windows were sent to me for consultation, and from one end of the building to the other no color was applied unless I saw it and approved. All these functions rightly come within the province of the decorator, and should have been placed in Messrs. Adler & Sullivan's hands if they were the master spirits and recognized authorities. As these details were not controlled by them, though of paramount importance, how can it appear that my original statement is "manifestly absurd" or "irresponsible"?

Yours faithfully, Joseph Twyman.

[Our correspondent's letter, if all put in type, would fill very nearly three pages of this journal, but we hope he will not accuse us of unfair use of the editorial pencil, since we allow him the same number of lines occupied by the statements he refutes. As we believe this matter is of vastly more interest to the disputants than to the rest of our readers and as the statements are clearly irreconcilable, we must ask them to leave the matter an open question. — Eds. American Architect.]

A CORRECTION.

Boston, February 29, 1888.

To the Editors of the American Architect:—

Dear Sirs,—In the "Notes of Travel" from Chicago, published last Saturday, I find an invidious comparison was made between the Rookery Building and the Maller's Building and the building for L. P. Hausen. It was a slip of my own and it was farthest from my intention to say that these latter structures were unsuccessful as compared with the Rookery. The paragraph relating to them should more properly have read, "All the buildings are not as successful in mass and detail as the Rookery, though there are many which are hardly less interesting and worthy of study," etc.

May I ask that you will kindly make this correction on my behalf and oblige C. H. Blackall.

A COLUMN LIKELY TO ESCAPE DRY-ROT.

Toledo, Ohio, February 23, 1888.

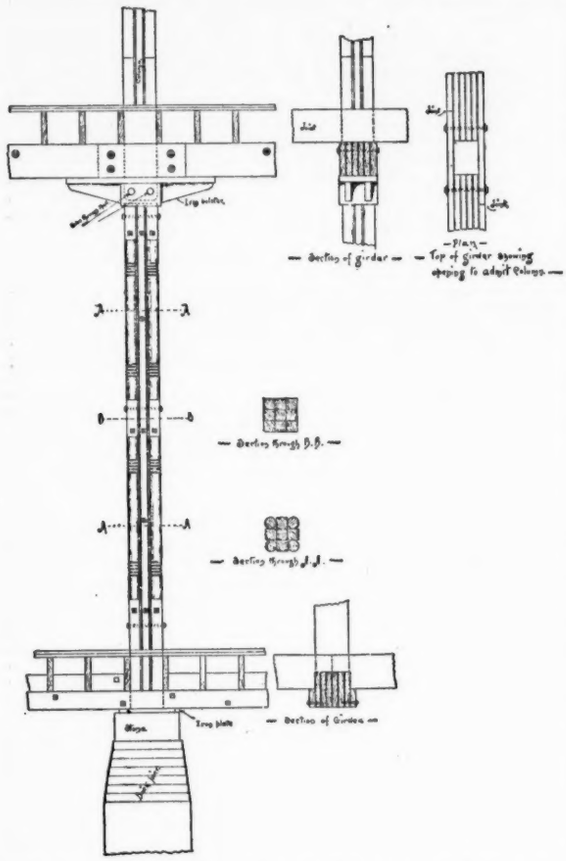
To the Editors of the American Architect:—

Dear Sirs,—Although the subject of "dry-rot" is a very commonplace one, it, nevertheless, seems to demand unceasing attention from all representatives of architectural and building interests. The almost utter impossibility of obtaining large timber of any kind that is absolutely seasoned, and at a price that can generally be afforded in the construction of supports of various kinds entering into warehouse, manufacturies or ordinary mercantile building, has rendered

it necessary to devise means of preventing insidious decay and dangerous season-checking.

For girders, etc., the use of two-inch joists, or thinner material, by bolting or spiking together numerous thicknesses, and having thin separating strips between, has long been successfully practised, as has the combination in various ways of partially seasoned material in the construction of wood columns.

I have lately had completed a manufacturing building in which I desired to use 12″ x 12″ oak columns, and it being impossible to obtain dry oak of that size, on short notice, a column was devised, using comparatively dry 4″ x 4″ oak scantlings bolted together, and having interior air-ducts; all fairly well shown in the accompanying sketches. The columns rest directly on top plate of iron bolster,



while the top end of column is received in a recess in bolster, about 1″ deep, and fitting rather loosely.

The result is very satisfactory, not only in the evident impossibility of dry-rot, but a rather handsome column is produced, as well as a very rigid one; while the cheapness of the material, and the ease with which it is turned and dressed, render the column but a trifle more expensive than one dressed and chamfered, or turned from a solid timber with a hole bored through the centre of its entire length.

While I have set forth no new principle of wood-construction, it is presumed that this somewhat novel application of old principles may prove of interest, and, possibly, of benefit to some of your younger readers, if not to certain of the older and more experienced members of the profession. Truly yours, N. B. BACON.

HOW TO APPROACH THE DESIGNING OF THE NEW YORK CATHEDRAL.

NEW YORK, February 18, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The article signed "L" in your issue of February 18th, suggests many thoughts. The difficulties that stand in the way of the erection of the proposed Protestant Episcopal Cathedral in this city no doubt exist, but the statement of them hardly touches the root of the matter.

Why is it that Messieurs A B and C would fail to build an harmonious whole? Why, in the absence of personal discord, would they probably be unable to obtain unity of result from their united efforts?

Is it not because they would be impelled in their task by no common, dominating idea; and the people for whom they built would be as devoid as they of any central thought upon which to hang their lives? Shall men who regard the Nicene creed from a standpoint of historical criticism build temples in honor of the Trinity? or shall readers of "The Bible of To-day" devise friezes enriched with patriarchal legends? Is it not certain, rather, that the work of such men for such a public would show that it was the work, not perhaps of unbelievers, but certainly not of believers? For, however, much men may go to church at the behest of their wives, or as the respectable thing to do, or even from piety where it exists, our age is a questioning age, and in theology to question is to deny.

Powerful as it may yet be in individual minds, the Christian faith is not for us the grand and only impulse of our lives at every moment, as it once was for all decent men over the progressive world. Can we, under such circumstances, expect that the work even of a single man could show the steady devotion to one purpose that the Middle-Age churches show?

To-day, we have no purpose. It is for our own glory that we work, not for the glory of our ideas. At the most, led by admiration of what men have done in past times, we erect our love of the beauty which they created into our deity, we adore Art, for its own sake; sincerely enough doubtless, but never yet did art for the sake of art produce anything worth producing. For all art there must be in us a leading idea, and a desire to express that idea. If the idea be great the art will be great, however unworthy of the idea; and, if the idea be small the art cannot be great art, though to extreme mechanical skill we add the refinements of book-culture and the opportunities of accumulated and concentrated wealth. In the absence of grand ideas we could not now carve even a crucifix that would be worthy of any but an anatomist's regard. Till we can illuminate the dead eyelids with the love of humanity, with which for Giotto they were illuminated, till we can paint in our Madonnas the yearnings of Ezekiel and Jeremiah over their people, and till we carve and paint for a people of whom the very poorest slave's mind is able to appreciate our carving and painting, because possessed by the same leading thought that enables us to create, we need not expect to be able to unify the multitudinous aisles of a great building and give every chisel mark a tongue.

A motive, in the literal sense, is needed for a design; motive for a cathedral church to-day there is none.

We can paint amorini and silk-clad shepherdesses in parlors where an affectation of innocence veils the spice of decent indecency in the talk, but there is nothing grand in our ideas. Heaven forfend! such would be very unbusinesslike sentimentality. Yet there is arising a thought in the minds of men which under cold and repelling formulas conceals a new and hot life, which makes it possible that the human race may once more be overmastered and intoxicated with the frenzy of an all-compelling idea.

The thought is the idea of solidarity.

It is to the interest of each one of us to abstain from injuring others. That is the formula — dry as the binomial theorem — that is to revivify the world.

Let the theologians study it and if they can grasp its meaning and its implications they will find that it is the new phrasing of the world-old love of man that has been phrased anew at every period of reform from Buddha to Jesus. Let them, if they can, throw aside the wornout sanctions for well-doing, that a military age demanded. Let them, if they can, realize that to do well is not now a task, but that, in this age of industry, all we need is liberty to do well. Let them, if they can, feel the throbbing that such words cause in the breast of one who knows what they mean; as the x's and y's of an astronomical calculation excite awe in the mind of him who understands them.

All this they can, if they will.

Let them, if they dare, write over the portal of their church the sign of the Kingdom that is coming, "Liberty, Equality, Fraternity," and they may hope to achieve something worth the achieving.

They will not dare. Strange, that words which separately we revere, thus grouped we shy at!

Yet, short of this, if they will build at all worthily, though less worthily, let them build with walls thick enough to keep out the cold, with windows large enough to admit the light of the sun, so that no great sun will be needed for maintenance to render it fit for occupancy. Let them then throw it open to all sects at all times for their great assemblies. Let the Salvation Army, if it will, fill its pavement with recruits. Let the Anti-poverty Society, if it will, assemble there in some vast corner. Let there be nothing stealable or fragile, but let it be a great covered square, where all may worship what they will and as they will.

Let the projectors go farther than this. In this democratic city there is no forum, no place where any man may speak his mind. In this city, where speech is said to be free, no man is free to speak his mind under the open sky. The homeless, the moneyless, can raise no voice in their own behalf, for a place to speak is essential to the privilege of speaking, and a place to speak must be purchased. Therefore let the authorities build their church over a platform that is entirely free to any man to spring upon and say his say at any time when nobody else is saying their say there.

So shall they be, if not leaders of the advance, yet not laggards where the sutler and canteen bring up the rear; if not reformers, at least not reactionaries; if not teachers of men, as they hold themselves to be: not false guides, blind prophets, purchased organs, as those who they think most need their teachings usually hold them to be. JOHN BEVERLY ROBINSON.

NOTES AND CLIPPINGS

A Substitute for Hydraulic Cement.— According to a statement of a well-known engineer, it is a fact peculiar to Spanish countries that ordinary brick-dust, made from hard-burned, finely-pulverized bricks, and mixed with common lime and sand, is universally and successfully employed as a substitute for hydraulic cement. That engineer says that during an engineering experience of some six years in Cuba, his opportunities were ample for testing its merits, and he found it in all respects superior to the best Rosendale hydraulic cement for culverts, drains, tanks, or cisterns, or even for roofs. In an experiment to test the strength of this product, it was found that a block of it, ½ inch in thickness, without sand, and after immersion in water four months, bore, without crushing, crumbling, or splitting, a pressure of fifteen pounds per square-inch. It is thought that, by the addition of pulverizing-mills to brickyards, to utilize the waste and broken bricks, a profitable manufacture might be carried on. — *Invention.*

Explosion of a Water-heater. — The danger of admitting live steam into closed vessels for boiling or heating purposes, unless they are either sufficiently strong to resist the highest pressure which can possibly be brought to bear upon them, or else guarded in such a way as to render the accumulation of pressure impossible, is one that we have often called attention to, and another fatal illustration of it was afforded in the case of an explosion that occurred on Thursday, the 29th ult., at Messrs. Greterex Brothers' brewery, Moss Side, Manchester. The explosion arose from the blowing out of the flat end of an old discarded steam-boiler which was used as a tank for heating water for washing barrels. The boiler measured about nineteen feet six inches in length by four feet five inches in diameter, and the water was heated by blowing in steam from the ordinary working boilers, which were loaded to a pressure of fifty pounds on the inch. The steam was supplied through a two-and-one-half-inch pipe, the flow being regulated by means of an ordinary wheel-valve three-and-one-quarter inches in diameter. The heating-tank was not fitted with any safety-valve, but there was a small open-ended pipe fixed to one end, the escape of steam from which indicated that the water in the tank had reached the boiling point. As the diameter of this pipe, however, was only one-quarter of an inch, it will be seen that it could be easily overpowered by the supply of steam, and unless care was taken to shut the regulating-valve as soon as the water boiled, there was nothing to prevent the pressure in the tank rising until it equalled that in the main steam-boilers. An examination of the end-plate that was blown out clearly showed that the pressure had been excessive, as the flat ends were bulged, while the pin securing the central longitudinal bolt-stay to the plate which was blown out had been fractured for some time, and was hanging by a mere thread. The angle-ring securing the end-plate to the shell had also been cracked through in many places at the root of about half the circumference. The end-plate, in a word, was in a dilapidated condition and quite unfit to resist internal pressure. As the water was not desired to be heated beyond 212 degrees Fahrenheit, there was no necessity for the pressure to accumulate, and all possibility of its doing so would have been avoided had the escape-pipe been three or four inches in diameter, instead of merely one-quarter of an inch, while the efficiency of the arrangement would have been in no way impaired. At the inquest held on Thursday, the 5th inst., on the body of the man who was killed, the jury evidently were of the same opinion, as they returned a verdict of "Accidental death," adding that "there had been a certain amount of negligence on the part of the firm in not seeing that there was an outlet on the vessel of the same diameter as the inlet." — *Engineering.*

The Vendome Column, Paris. — When the column in the Place Vendôme was erected, a bargain was made with an ironfounder who had never been engaged in bronzework. He, however, had the temerity to undertake the moulding and finishing at one franc per kilo, or say nine pence per two pounds. The Government undertook to deliver to him in guns, taken from the Russians and Austrians during the campaign of 1805, the quant ty of bronze necessary for the completion of this enormous monument. The founder used a furnace he had for casting iron, but not being aware of the phenomena of bronze casting, and urged by his vanity to attempt in the first instance the casting of several of the great pieces of the base of the column, he encountered several defeats. Each time he necessarily altered the alloy by oxidizing the tin, lead and zinc, which metals, so oxidized, passed into the scoriæ or were carried off by the current of warm air. He did not perceive this cause of continual loss, and continued to produce the bas-reliefs, but it may be readily conceived that they contained more copper than the bronze of the guns. When the founder had got two-thirds through the column, he found out that he had got no more metal, and being, according to contract, responsible for the metal delivered to him, he was at once ruined. In this lamentable situation he tried to melt up the white metal obtained from the reduction of the scoriæ and a large quantity of refuse metal which he had bought up at a low price. The bas-reliefs which he obtained from the mixture of all these materials were marked with blotches and lead spots; their color, from a dirty gray, became quite black. The authorities refused to receive work so defective, and put his foundry under sequestration. He succeeded, after much petitioning, in obtaining a committee to examine his accounts, which was composed of two chemists, two architects, two mechanical engineers and two founders, with an auditor of the Council of State for the chairman. The weight of each piece delivered by the founder was known; specimens were taken from them, and the proportional parts weighed, from which was made an ingot representing the mean composition of the whole column. It was then found by analysis that it contained eighty-nine parts of copper, seven of tin, and three of lead in one hundred parts. The committee then took specimens of bronze from the guns remaining in the Government stores, and an ingot was formed to represent as nearly as possible the mean composition. The analysis of this ingot gave eighty-nine parts of copper and ten of tin. It was further known that the law of France had fixed the composition of gun-metal at ninety parts of copper and ten of tin per hundredweight, but that this law was never well executed, and during the Revolution scarcely attended to at all; it was also known that these foreign guns were of a more complicated and baser alloy than the French. Taking all these circumstances into consideration, the committee were of opinion that the founder had produced an alloy, if not superior, at least equal, to that which had been given to him, and that they considered that he could not be charged with fraud in his contract. The chemical operations further explained the whole proceeding; by making separate analyses of the specimens of the great bas-reliefs, the shaft and the capital, it was found that the first had only 0.06 alloy per quintal; the second, particularly towards the upper part, and the third contained as much as 0.21. It was, therefore, evident that the founder, not knowing how to manage bronze, had refined his alloy by several times remelting, and consequently diminished the total weight, and that to make up for this loss he was obliged to put into the last castings the white metal extracted from the scoriæ. Thus he had given bronze of too good alloy in the beginning, which had obliged him at last to make the alloy too low. The moulding of the several bas-reliefs was so badly executed that the chaser employed to go over them removed by chiselling or filing a weight of bronze equal to 70,000 kils. (7 tons), which were given to him, besides a sum of 300,000 frs. (12,000 l.) paid down. — *César Daly.*

TRADE SURVEYS

Business drags a little because prices and values have not been fully determined. Railroad stock and bond speculation halts because of long standing, as well as accidental causes. The expansion in real-estate values is taking a new shape, because a different class of investors and operators are at work. The volume of money is ample for business requirements; first, because there is but little speculation; second, production and exchange are nearly equalized; third, indebtedness, as compared to the producing capacity of the country, is light, and hence less money is needed to take care of it; fourth, because of the general solvency. It is fortunate that corrective agencies are applied, by which evil is averted and complications and mistakes avoided. The business world is just now shouting "low bridge" to itself, and is waiting until the bridge is passed. The agitations apparent on the surface, and the real agitation going on beneath the surface, are widely different. The masses are struggling after opportunities, while the few are seeking to obtain control over the hidden forces, which control the activity and volume of trade and business. In the past, the banking interests controlled. At present trade exercises more control to epitomize the tendency. A few years ago the Grangers feared the power and aggressiveness of railroad corporations, now they fear them less. To-day trade combinations as manifested in trusts threaten the peace of mind of the grand army of business men. To-morrow, so to speak, they will smile at their fears. The trusts are harnessing the great trade interests, and infusing a needed spirit of organization. This tendency and development is too recent to justify such general denunciation. It has a work to do in helping to eradicate or correct commercial feudalism, and establish a higher form of commercialism as was done politically in the transition from feudalism to constitutional government. We are doing in trade what has been already done in the workshop. Individualism may suffer, but the commercial results, when results come to be counted, will be found on the right side. In all branches of business there is a conservative feeling which keep prices pointing downward rather than upward, and which reminds the manufacturer that the margin between sufficiency and overproduction is narrow. The talked-of dulness in trade is due to the instinctive adjustment going on between the great producing and distributing forces of society. In short, the middlemen are casting about them to see that there are sufficient markets to absorb production. This will not take long. Labor might make trouble and delay, but it does not threaten, or manufacturers might, as they have at times, lose their heads and rush madly into overwork, but they do not. They want to see their customer's face and his pocketbook. That which has frequently produced panics has been the disarranging of these two mighty forces of production and exchange, and the undue enhancement of values growing out of the mad zeal of the producing interests. In this point of view the tariff agitation will produce good results. It keeps the manufacturer's eye on the ultimate and creates a sort of leven, within to which the stream of energy and enterprise had best confine itself. The building interests are awaiting the word of command. The greatest activity this year will be in small cities and towns, and in entirely new sections. New industries are being planted in far-off places, and the outflow from the older States of the thrifty population which will seek to establish the surroundings from which it fled for better opportunities, will help, very naturally, to maintain the demand of the past year in the smaller trade channels. A reduction of wages is probable in many branches this year, but employers will not attempt to unsettle schedules The workers in wood, iron, steel, oil and coal will have very little enforced idleness this year. The great manufacturing centres are even now pretty well supplied with actual or obtainable orders. Yet, every one flippantly says, this year wont be what last year was, and this, too, simply because two or three thousand miles less of railroad-building will be done. The premises and the conclusions are not in harmony. The iron and steel mills of the country have not been so short of orders, taking them in the aggregate, for months, but prices are firm and buyers know there is no room for weakness at present cost of labor. The same deduction applies to nearly every industry. Whatever delay shall be encountered will not be due to inflated prices. The machine-shops of the country are generally better employed than for months. The work in sight is encouraging. As so often stated, enormous investment must continue to be made in new directions. The railroad activity of the past three years necessitates a high degree of industrial activity for the next two or three years.

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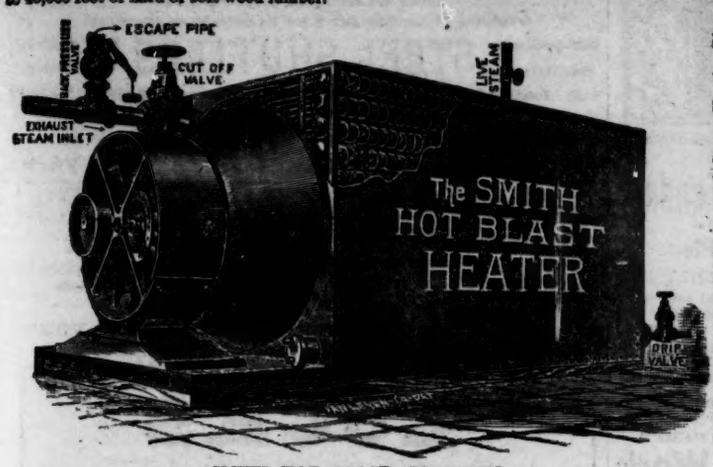

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